EQUIPMENT ECONOMIES
NUMBER – MARCH, 1952

Railway Engineering and Maintenance

ERIE RAILROAD
SCENIC ROUTE
OF THE EAST

ERIE

The Erie is one of the country's pioneer railroads with a long and colorful history of transportation progress dating back to 1832. Looking forward to the future, it will soon be completely Dieselized. The Erie has always been noted for its highly maintained roadway—making possible high speed freight service and excellent passenger service on its Scenic Route between Chicago and New York.

"SEE YOU IN CHICAGO"

The bags are all packed. Suzie at the office has all her instructions and in a "jiffy" we'll be leaving for the windy city to renew old acquaintances and see what's new in railway equipment.

All aboard! Let's go and make it a worthwhile and beneficial trip. We extend to you a personal invitation to stop at our booths 82 and 83 and see the newest and scientifically developed Hy-Crome Spring Washers for track and accessories, motive power and car equipment applications.

Whether you are on the run or taking a slow walk, stop in. We would like to say "Hello."

Reliance Hy-Crome Spring Washers for Track Applications

EATON MANUFACTURING COMPANY, RELIANCE DIVISION

OFFICE AND PLANTS • MASSILLON, OHIO

SALES OFFICES: NEW YORK • CLEVELAND • DETROIT • CHICAGO • ST. LOUIS
SAN FRANCISCO • MONTREAL

One of the Simplest Switch Stands ever devised

That's why it almost *never* gives you trouble.

Bethlehem's Model 53 is so simple in design that there's practically nothing to get out of order. This is a stand with only three moving parts—throwing lever, sliding block, and spindle-and-crank assembly. It's as foolproof as anything ever built.

Want a look inside? The lower picture shows the working parts. As the lever is thrown, the block transmits the force that turns the spindle and screw-eye crank. That's all there is to it. Moreover, the extra-high leverage means an easy throwing action.

The Model 53 is widely used in mainline service and heavier types of yard work. It's a natural for either, since it so well combines both power and simplicity. Like more details? We'll gladly supply them at your convenience.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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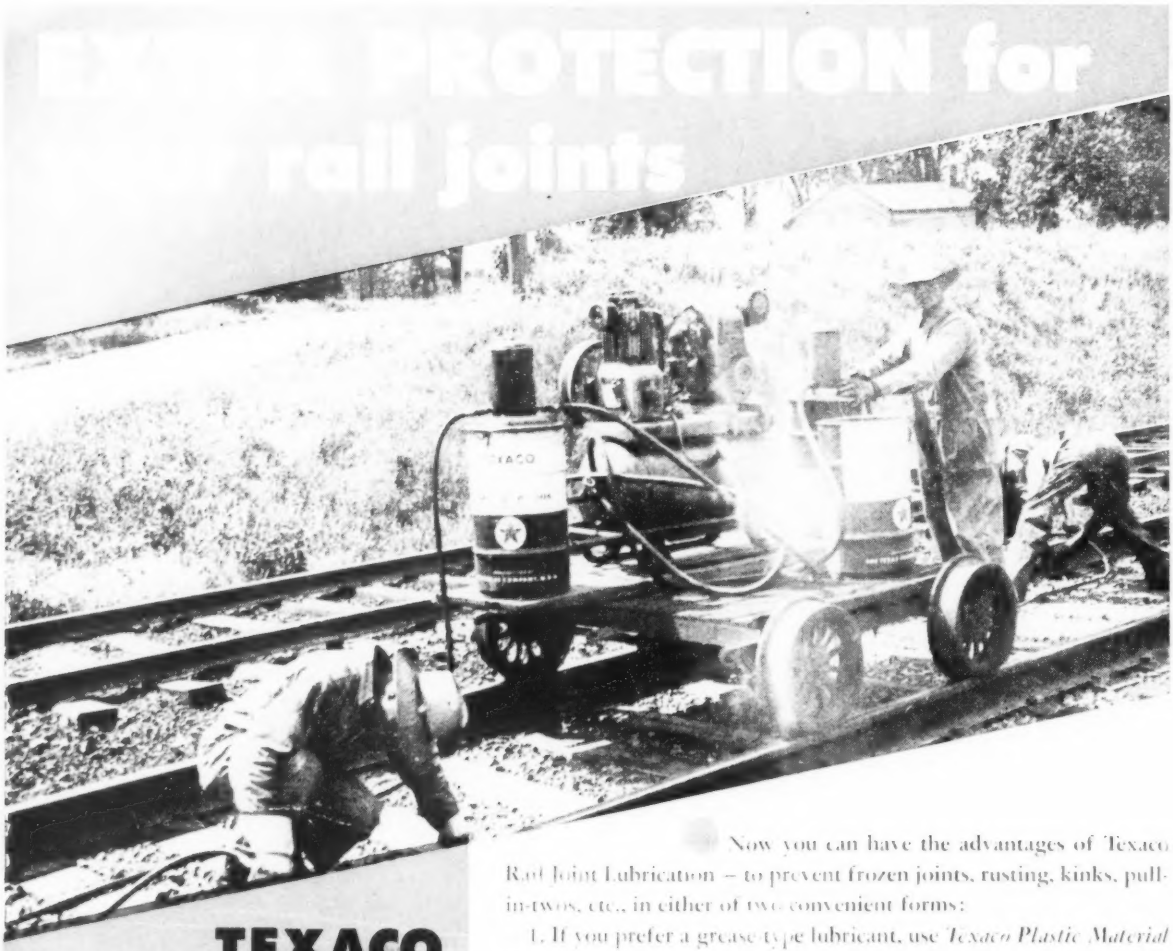
Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, one year $2.00 (special rate to railroad employees only, one year $1.00). Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Bristol, Conn. Volume 48, No. 3.



TEXACO Rail Joint Lubrication

prevents freezing, kinking, pulling apart and rusting

Now you can have the advantages of Texaco Rail Joint Lubrication — to prevent frozen joints, rusting, kinks, pull-in-twos, etc., in either of two convenient forms:

1. If you prefer a grease-type lubricant, use *Texaco Plastic Material "H"* to seal the joint ends, then pump *Texaco 904 Grease* into the joint through an applicator pipe.

2. If you prefer a spray-type lubricant, use *Texaco Rail Joint Lubricant*. Simply spray it through one end of the space between the rail and the joint bar. The lubricant will penetrate into the fishing surfaces and around the bolts.

Either way, Texaco Rail Joint Lubrication provides long-lasting protection, easily applied under traffic and without taking the joint down. The lubricating film is effective regardless of temperature changes or moisture.

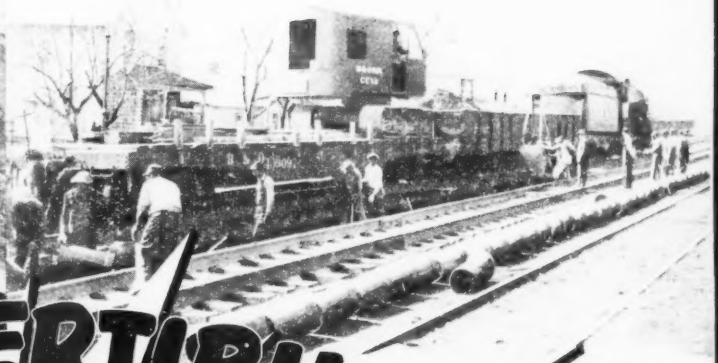
For asphalt-cement pressure grouting, use *Texaco No. 24 Emulsified Asphalt* — a big help in eliminating "soft track." For ballast that stays cleaner and drains better, coat stone with *Texaco Asphalt*.

Let a Texaco representative give you full particulars. Just call the nearest Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis, or Atlanta; or write The Texas Company, *Railway Sales Department*, 135 East 42nd Street, New York 17, N. Y.

TEXACO Rail Joint Lubrication

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER, starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.



REAL CONVERTIBILITY

IS MORE THAN A CHANGE OF BOOMS!

THE VARIETY of work characteristic of maintenance problems calls for easy convertibility. Conversion means more than changing a boom! It means fitting a piece of equipment for a different class of work!

Northwest pioneered the convertible Shovel—Crane—Dragline and Pullshovel. Behind Northwest convertibility is an experience that others have yet to acquire. Other equipment is often spoken of as "A Good Crane", "A Good Dragline", or "A Good Shovel or Pullshovel"! When you change from one type of operation to another on a Northwest, you do so with the full knowledge that you are combining the new attachments with a group of operating advantages which have made Northwest universally recognized as a leader. This is true whether operating as a Shovel, Crane, Dragline or Pullshovel!

Real Convertibility is more than a change of booms!

NORTHWEST ENGINEERING COMPANY
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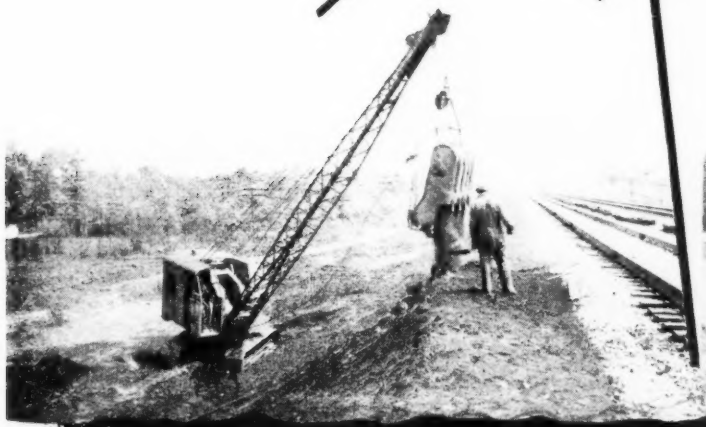

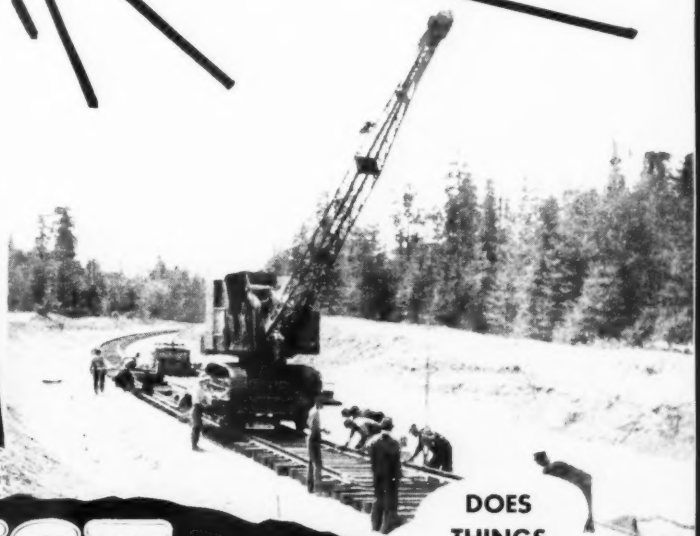

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

DOES THINGS NO TRACK-TYPE RIG CAN DO

EXTRA PROTECTION for your rail joints

TEXACO
Rail Joint Lubrication
prevents freezing, kinking, pulling apart and rusting

Now you can have the advantages of Texaco Rail Joint Lubrication — to prevent frozen joints, rusting, kinks, pull-in-twos, etc., in either of two convenient forms:

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NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

DOES THINGS NO TRACK-TYPE RIG CAN DO

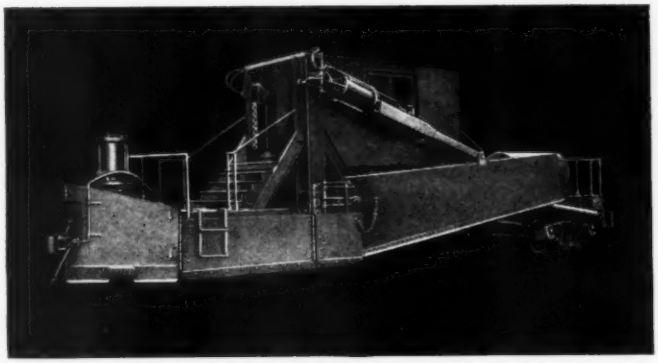
3 GOOD ANSWERS—

TO ROADBED MAINTENANCE PROBLEMS

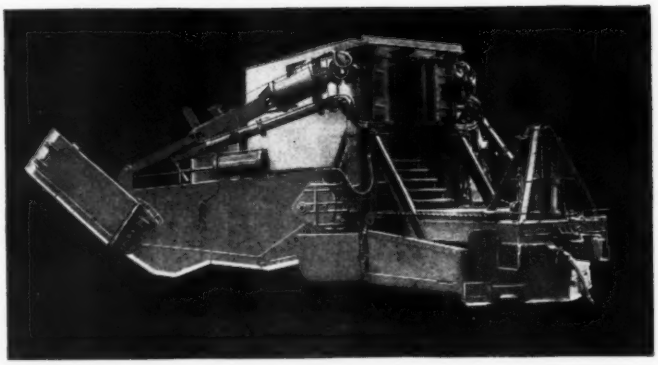
The complete Jordan spreader-ditcher-snow plow line offers you a year-around solution to every roadbed maintenance and snow removal problem: ballast plowing, roadbed shaping, ditch cutting, fill spreading, bank widening, shoulder dressing, ice cutting and track flanging.

Plan to watch a Jordan in action and you'll see why so many railroad men say, "It does the work of an army of men."

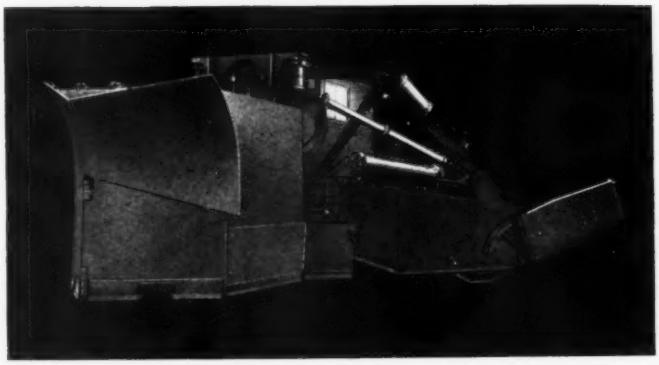
SPREADERS—



DITCHERS—



SNOW PLOWS—



O. F. JORDAN COMPANY

WALTER J. RILEY, *Chairman of the Board*

EAST CHICAGO, INDIANA

For additional information, use postcard, pages 211-212

Don't take our word for it...

WILL YOU BELIEVE YOUR BRANCH LINE SUPERVISORS?

Because Branch Line Supervisors must work with *used* material, *they know* which rail anchor has the highest relative application value.

And *we know* which rail anchor they prefer . . . *but don't take our word for it, ask your Branch Line Supervisors!*

THE ADVANCED TYPE WOODINGS RAIL ANCH

Woodings FORGE & TOOL CO.

Chicago • VERONA, PA • St. Louis

BIG Tractor-shovel with BIG push

4-wheel drive PAYLOADER®

The big 1½ cu. yd., 75 horsepower Model HM "PAYLOADER" is fast earning a reputation as a valuable off-track maintenance-of-way tool because of its combination of power, mobility and versatility — power and traction to get *big* production even when ground conditions are poor . . . mobility to move quickly to the job under its own power at speeds up to 16 miles per hour, and to walk easily over the rails . . . versatility to dig, load, grade, bulldoze, backfill, spread, pull and push.

This tractor-shovel also makes a hit with operators because it rides easy and has a big comfortable seat, power-boosted steering and fingertip hydraulic control. Four speeds *reverse* as well as forward permit as fast operation in both directions as the job conditions allow, and there's a choice of gasoline or diesel power. Once you've seen a Model HM in action you'll understand why hundreds of owners and operators are its enthusiastic boosters.

The Frank G. Hough Co., 751 Sunnyside Ave., Libertyville, Ill.

WRITE for catalog on the 1½ yd. Model HM or the six other "PAYLOADER" sizes down to 12 cu. ft. bucket capacity.

PAYLOADER®

SAY HUFF

THE FRANK G. HOUGH CO.

NOW! when maintenance is more important than ever

use Penta*-Protected wood

Heavy traffic does not *have* to mean more maintenance for busy equipment. You can cut maintenance by protecting car lumber, and all lumber, with PENTA . . . and give your wood longer, more dependable life.

PENTA protects wood against termites and decay, gives wood greater serviceability. PENTA-PROTECTED WOOD is clean, easy to handle and can be painted. PENTA is economical, too!

Railroad service records *prove* that treated wood lasts three to four times longer than untreated wood. This means that PENTA-PROTECTED WOOD costs you *less per year!*

USE PENTA-PROTECTED WOOD not only for car lumber but also for poles, loading platforms, all wood buildings and other wood construction. Protect your investment in wood. Make it a *sure* thing . . . with PENTA!

INVESTIGATE Penta THE CLEAN WOOD PRESERVATIVE

*PENTA is a popular abbreviation of the name of the chemical, PENTAchlorophenol

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
Penta

PREPAKT CONCRETE

INTRUSION GROUT

FOR

CONCRETE AND MASONRY REPAIRS • NEW CONCRETE CONSTRUCTION • BRIDGE PIERS • COFFERDAM SEALS • CAST-IN-PLACE PILES • CASING AND PROTECTION OF WOOD PILES • GROUTING • FOUNDATION STABILIZATION • UNDERPINNING • TUNNEL MAINTENANCE • DAMS • RETAINING WALLS • GROUTED CORE WALLS • EXPLORATION

Years of PREPAKT experience and careful job control assure you of the following qualities in PREPAKT CONCRETE:

- Any desired ultimate strength—1500 to 7000 p. s. i.
- No setting shrinkage and 50% less drying shrinkage.
- High permanent bond to existing concrete.
- Superior weather resistance, especially to cyclic freezing and thawing.
- Superior resistance to action of salt water.
- High impermeability to moisture.

PREPAKT, with all these favorable properties, requires 30% to 60% less portland cement than ordinary concrete of equal strength. PREPAKT may be made under water as well as in the dry, with equal facility and without increasing the cement content.

CONTRACTORS
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SPECIAL
SERVICES

INTRUSION-PREPAKT, INC. THE PREPAKT CONCRETE CO.

CHICAGO • TORONTO • SEATTLE **CLEVELAND 14, OHIO** SAN FRANCISCO • PHILADELPHIA

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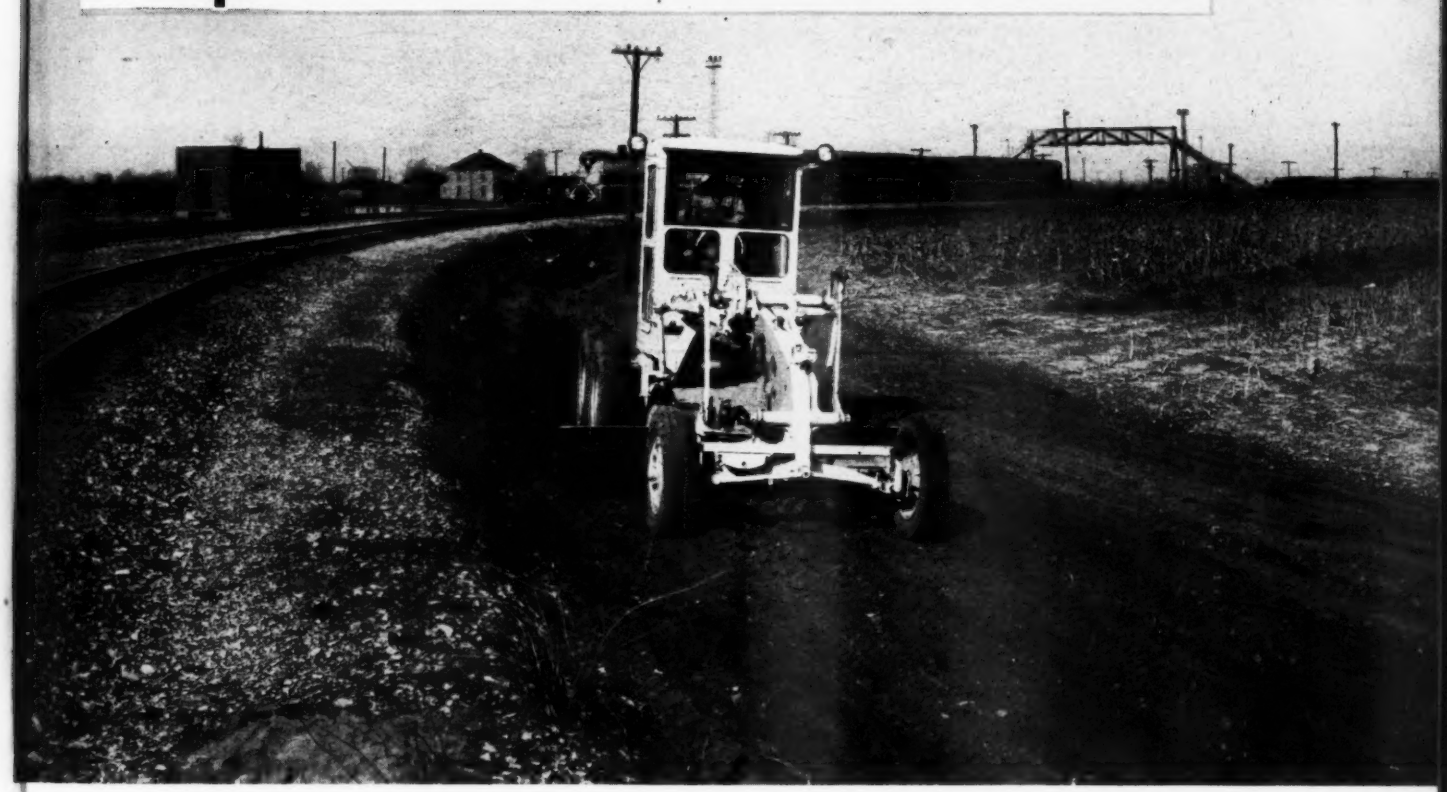
"Cat" No. 212 Motor Grader slashes maintenance costs on 24-mile right of way!



This "Cat" No. 212 Motor Grader is making a three-foot cut about 18 feet wide in the Davis Yards of the Alton & Southern R. R., East St. Louis, Illinois. Working on a 24-mile right-of-way the No. 212 has proved itself a money saver to Roadmaster C. B. Blackman. Its blading efficiency and tandem drive action rate high with Operator James Wilson.

It's been more than two years since the Alton & Southern R. R. purchased this "Cat" No. 212 Motor Grader. That's long enough to show how many jobs this versatile machine can do on right-of-way maintenance.

Here's one example. Cutting down embankments once cost the Alton & Southern more than $400 per job for labor alone. The No. 212 slashed this sum to $5.76 and shaved the working time from 2 days to 4 hours. The No. 212 also proved itself a money saver building roads, sloping fills, removing snow, eliminating irregular fills, pulling ties and taking up track. It's so handy, it's kept busy all the time.

Wherever you're using trucks for track and road-bed maintenance, a "Cat" Motor Grader is an essential tool. Like all "Caterpillar" equipment, it's sturdily built. Of course, with good care, it will give you longer wear—and that's in line with defense demands. Making equipment work harder and last longer is your job, as well as the job of more than 300 "Caterpillar" Dealer parts stores and shops in the U. S. and Canada.

CATERPILLAR, PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Cummins® Diesels
do so many jobs - so much better

Shovels, cranes, industrial locomotives

Drilling rigs, centrifugal pumps, generator sets

Buses and on-highway trucks

...because they're custom-built to fit the job

Earthmovers, logging yarders and loaders

Off-highway trucks, crawler tractors

Work boats, pleasure craft

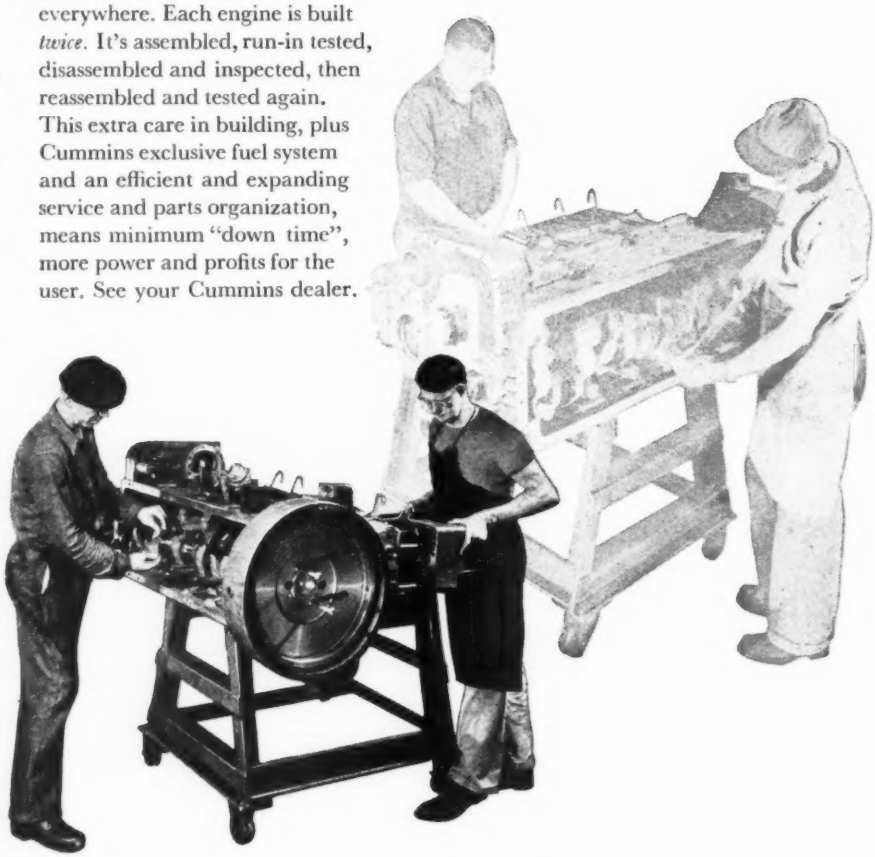
Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

---

...because they're

BUILT NOT ONCE BUT TWICE

Rugged, lightweight, high-speed Cummins Diesels are at work everywhere. Each engine is built *twice*. It's assembled, run-in tested, disassembled and inspected, then reassembled and tested again. This extra care in building, plus Cummins exclusive fuel system and an efficient and expanding service and parts organization, means minimum "down time", more power and profits for the user. See your Cummins dealer.



CUMMINS Dependable DIESEL

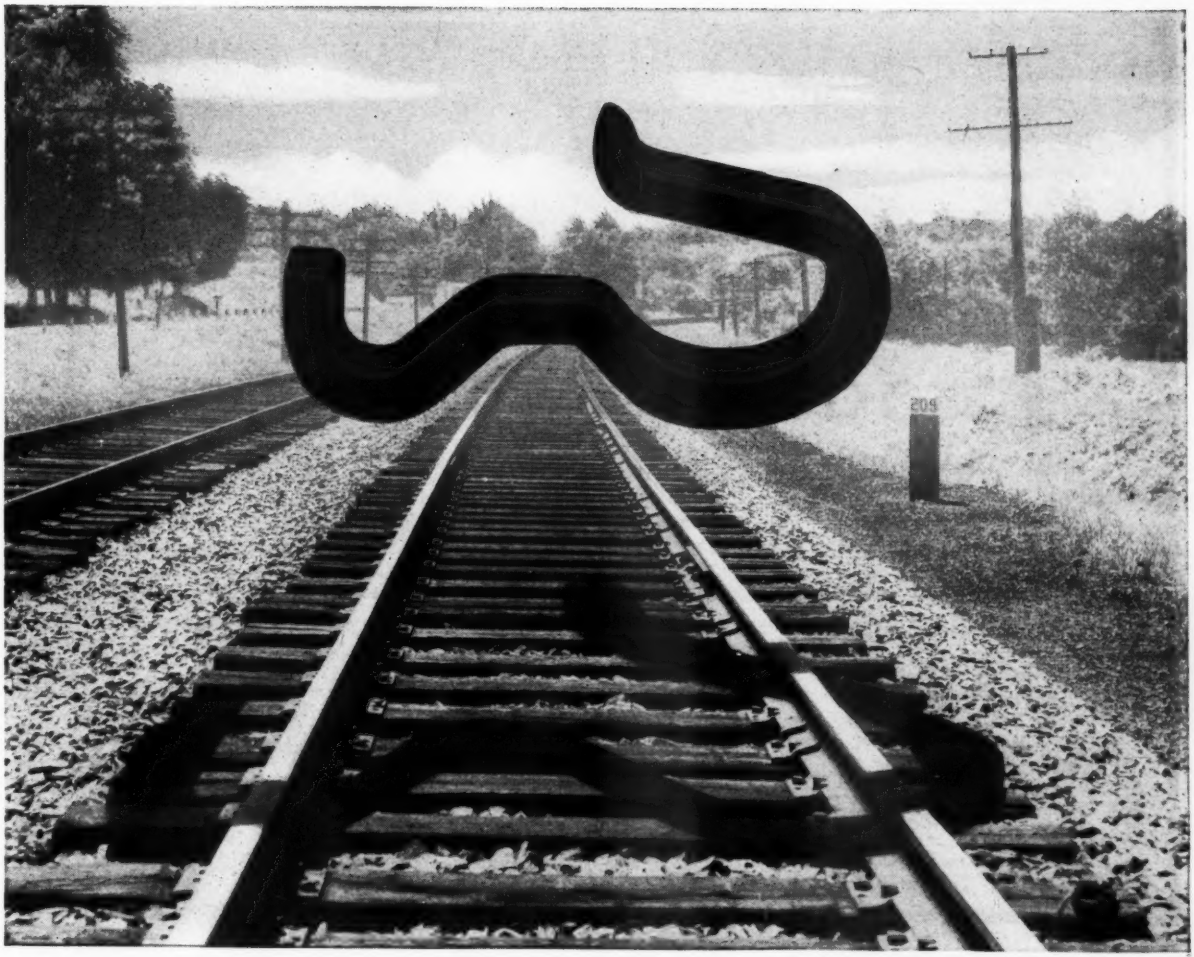
TRADEMARK REG. U. S. PAT. OFF.

Diesel power by CUMMINS

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Export: Cummins Diesel Export Corporation • Columbus, Indiana, U.S.A. • Cable: Cumdiex

For additional information, use postcard, pages 211-212



Here are the facts about the

IMPROVED GAUTIER RAIL ANCHOR

Please visit our Booth No. 183 at the National Railway Appliances Exhibition—Coliseum—March 10-13, 1952.

It is made of tough durable 1⅛"x¾" alloy spring steel bars, scientifically formed and heat treated to insure uniformity.

It is one of the heaviest and strongest standard size rail anchors on the market.

It provides plenty of bearing area against the rail and tie; eliminating points of concentrated loading—distributing stress and strain evenly.

It meets the requirements of the track engineer and the A.R.E.A.

Write today for complete information and folder

1. Saves Labor: The improved Gautier is a one piece anchor that can be applied quickly with maul or spike maul.
2. Can't Be Overdriven.
3. Low Maintenance Cost: Alloy spring steel plus scientific design assure long, trouble-free service.
4. For New or Old Rail: Substantial take-up and 4-point rail contact make the improved Gautier the most suitable rail anchor for re-application.

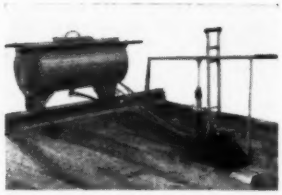
Manufactured and Sold exclusively by

MID-WEST FORGING & MANUFACTURING COMPANY

General Office, 38 South Dearborn Street, Chicago 3, Illinois . Manufacturing Plant, Chicago Heights, Illinois

WOOLERY self-propelled off-track Joint Oiler with three operators can spray joints on 1½ miles of track per hour. Uses heavy lubricants heated in 25-gallon tank and sprayed into joints under pressure, for thorough, long-lasting economical lubrication. Only 30" wide, to operate easily or turn around between double tracks.

WOOLERY Tie Plate Spacer quickly and accurately locates single or double shoulder plates at exact position on ties. Light in weight so that one man can easily handle it on or off track. Simple adjustment allows for changes in rail sizes. Ruggedly built for long service, this machine greatly speeds the job of rail laying.

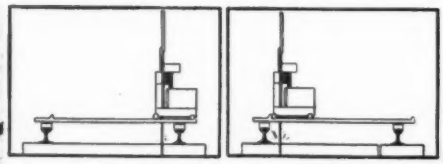


WOOLERY Creosote Sprayer, with 60 gallon tank capacity. Equipped with generator burner to heat creosote, and wind protection hood to safeguard operators, it applies a metered amount of creosote to each freshly-adzed tie. Does a safer, more economical and uniform job than is possible by old fashioned hand swabbing or broom-and-pail methods.

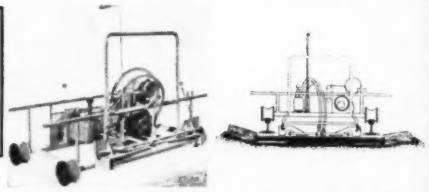
WOOLERY MAINTENANCE MACHINES *for* Better Track & LOWER COST!

The WOOLERY Team for Greater Savings in Tie Renewals!

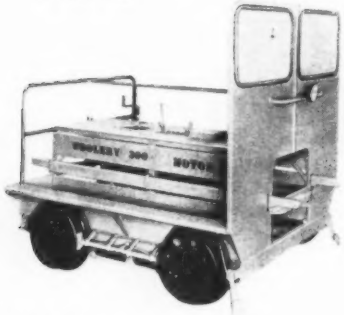
The WOOLERY Tie Cutter provides a proven money-saving method of removing old ties without trenching, jacking up track, or adzing tops of rail-cut ties.

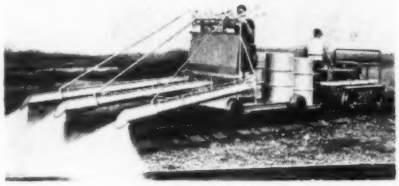


After tie has been cut on both sides, the operator of the NEW WOOLERY TIE END REMOVER removes center section in the usual manner with tie tongs and then moves the NEW WOOLERY TIE END REMOVER into position and drops the double-ended hydraulic cylinder into the tie-bed. A simple turn of the valve pushes the tie-end completely clear of the rail.

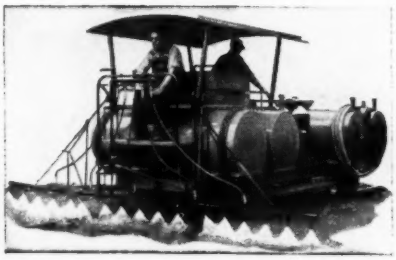


WOOLERY 300 Motor Car gives advantages of a light car, plus greater pulling power with 4 wheel drive and heavy duty performance. Carries 8 men and track tools. Can be fitted with detachable WOOLERY Flangeway Cleaner for winter duty.





WOOLERY Model PB-B Weed Burner will destroy a swath of weeds 15 feet wide in one trip or up to 25 feet with burner arms extended on second run. All three burners have electric ignition and individual controls. Only two operators required. Other WOOLERY Weed Burners in 1-burner and 5-burner models.



WOOLERY dual purpose Combination Sprayer and Weed Burner permits choice of chemical spraying (near buildings or in areas where burning is not practical) or weed burning, as desired. Chemical sprayer, covers 18-foot swath. Burning unit at opposite end covers 15 feet first trip; up to 25 feet second trip.

SINCE 1917 RAILWAY MAINTENANCE EQUIPMENT

Woolery MACHINE COMPANY

2919 COMO AVE. S.E. MINNEAPOLIS 14, MINN.

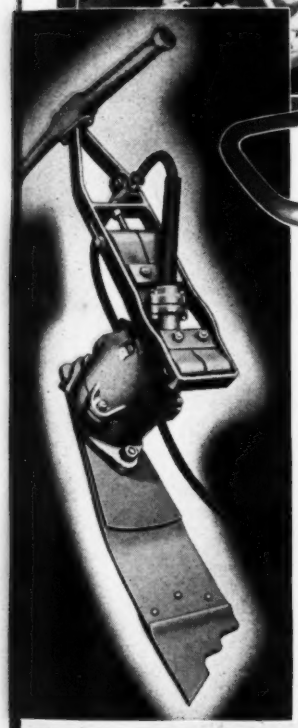
Exclusive Export Representatives

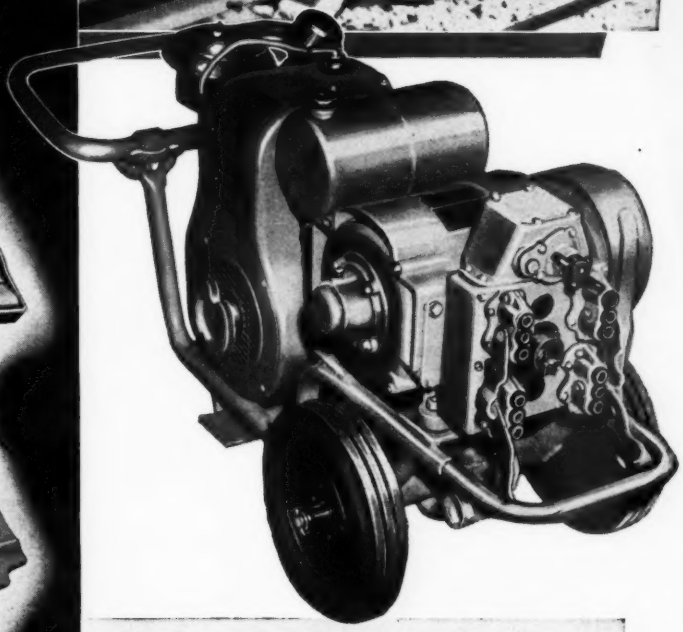
PRESSED STEEL CAR CO., NEW YORK, N. Y.

NEW WOOLERY TRACK TOOL TRANSPORTER

This handy, lightweight push car carries tools to the job site from unloading point. Men don't have to tote tools and equipment—save time and muscles for the important job!

JACKSON UNIT TIE TAMPERS





Excellent

MEANS OF REDUCING SECTION GANG COSTS and LABOR SHORTAGE!

In giving your section gangs the leverage of mechanization, provide them with JACKSON VIBRATORY TAMPERS — not only because they are the fastest and most reliable, but also because with their quickly interchangeable tamping blades for all lifts of track and kinds of ballast, your supervision and tamper operators have at their immediate disposal a machine specifically adapted to the work in hand. The ideal section gang outfit is our M-2 Power Plant and 2 to 4 tampers. The power plant is easily portable, readily handled by even the smallest gang. It generates both single-phase and 3-phase 115 volt, 60 cycle AC and may be used for lighting, emergency signaling, and operating other power tools.

And ALSO PROVIDING FOR TOP-NOTCH EXTRA GANG OPERATION!

With JACKSON 4-Tamper outfits on your sections you are also well equipped for extra gang operations, for they may be grouped for any major ballasting job with results that are exceeded only by the JACKSON Multiple Tamper. Let us tell you more about them.

ELECTRIC TAMPER & EQUIPMENT COMPANY
LUDINGTON MICHIGAN

RUST-OLEUM

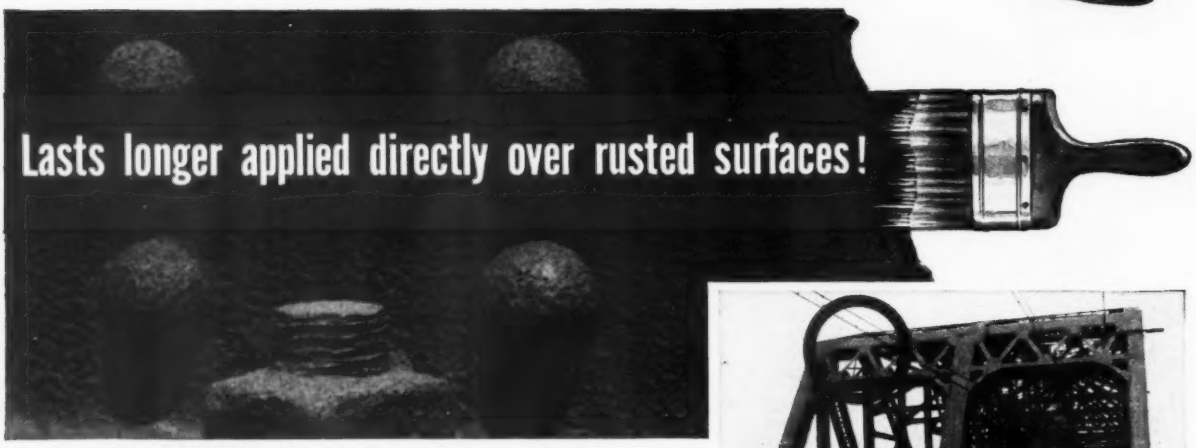
STOPS RUST!

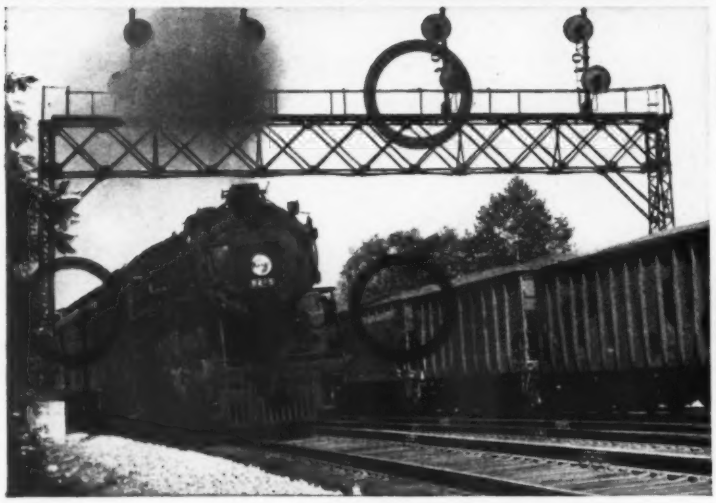
Cut Your Maintenance Costs On Signalling Equipment, Rolling Stock, Bridges, Towers, Tanks, etc.

Here's the *practical, sensible* answer to your rust problems! Costly sandblasting or chemical precleaning are not usually required . . . just wirebrush and scrape to remove rust scale and loose particles . . . then apply RUST-OLEUM by brush, dip, or spray over the rusted surface. Dries to a tough, elastic, rust-resisting film that lasts longer applied over rusted areas. So easy to use that one man often does the work of two . . . saves you time, labor, and money. Get the complete story from your RUST-OLEUM Rust Preventive Railroad Specialist today!

RUST-OLEUM CORPORATION
2547 Oakton Street, Evanston, Illinois

Available In All Colors, Aluminum and White





Request Your FREE Copy of The RUST-OLEUM Railroad Catalog Now!

Ingersoll-Rand Heavy Duty

AIR TAMPING GUN

Speeds up jobs where tie tamping is toughest

DOUBLE POWER

for tighter tamping!

THE NEW MT8 gives you twice the power of standard tamping guns. It's designed to insure better work at fixed elevations! It is also an excellent tool for spot tamping under difficult ballast conditions!

The trend today is toward heavier rails and longer ties to meet increased traffic. Tighter tamping that stands up longer is a "must" these days.

That's why the powerful I-R MT8 Tamping Gun does a better job for you. Although it develops twice the power of the standard tamping guns, it only weighs 14½ pounds more, and is well-balanced for easy handling. Standard tamping steels are used.

Give the new MT8 a try-out and notice its low air consumption. You can operate two of these extra powerful guns from one portable 3R36 Spot Air Compressor!

Get full details on the MT8 from your nearest I-R branch office. You'll get prompt attention if you call, write or wire.

It's *New!*

Compact . . .

Extra-powerful . . .

Convenient throttle is protected . . .

Air inlet quickly changed to left-hand operation . . .

Handles easily!

Ingersoll-Rand

11 Broadway, New York 4, N. Y. 732-11

ORIGINATOR OF MECHANICAL TAMPING

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

RUBBER-TIRED T

LeTOURNEAU LEADERSHIP IN DOZERS

1 First LeTourneau dozer in 1926 . . . in the quarter century since that time more than 30,000 job-proved LeTourneau dozers have been built and shipped all over the world . . . far more than by any other manufacturer.

2 Universally preferred . . . almost every major dirtmoving operation around the world includes a large number of LeTourneau rubber-tired dozers . . . proof of acceptance, and ability to take punishment and help lower earthmoving costs.

3 Tournadozer was developed in 1946 . . . put 'dozing on a high-speed basis . . . eliminated track wear and maintenance costs. You travel at 19 m.p.h. from job to job . . . interchangeable attachments make it a year-round producer!

4 Reports received daily tell of outstanding performance of Tournadozers which have now been *in the field all over the world for over 4 years.* Some of these machines are operating 24 hours a day . . . seven days a week . . . year after year.

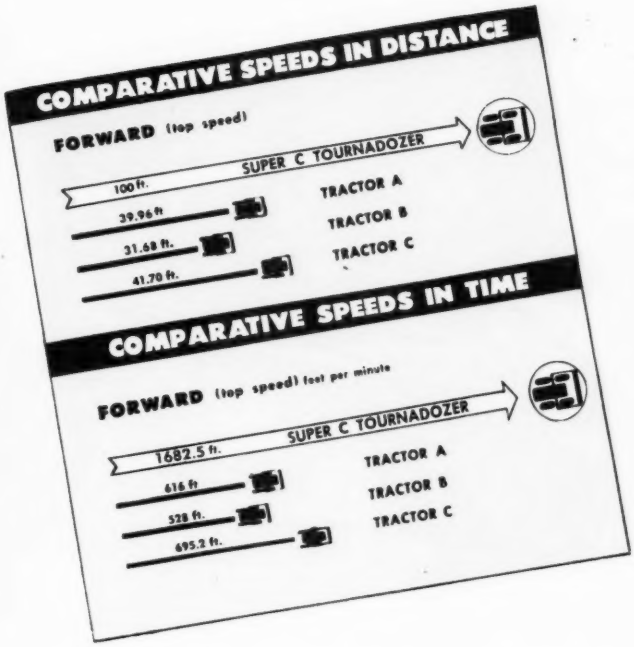
Tournadozer—Trademark Reg. U. S. Pat. Off. ML11rr

LETOURNEAU LET EQUIPMENT

HIGH-SPEED, RUBBER-TIRED EXCAVATING

TOURNADOZER...

applies high speed to all dozing jobs



Le Tourneau, pioneer in the use of rubber-tired earthmoving equipment, has long realized the need for a high-speed, high-production dozer . . . a machine built as a unit that would overcome limitations of the slow-moving, crawler-tractor dozers. The Super C Tournadozer is LeTourneau's answer. It is fast, mobile and powerful, incorporating new highs in speed, maneuverability, visibility. It's an all-surface, all-weather tool that goes anywhere . . . right now!

Tournadozer is revolutionary because its working principle is completely new and different. It is the FIRST heavy-duty dozer on rubber designed as a unit specifically for high-speed, high-production, and lower-cost dozer work.

It applies 186 h.p. to 4-wheel drive on 21.00 x 25 low-pressure tires . . . gets more work done in less time, gets to the next job faster. Tournadozer goes anywhere via highway, down the tracks, across yards, or along the right-of-way . . . does not tie up work-train equipment or delay train traffic, needs no train orders, no extra manpower for stand-by crews. One-man operated Tournadozer becomes a complete and independent work unit.

Tournadozer's powerful 4-wheel drive gives almost 3 times the forward speed, plus reverse speeds far faster than most crawlers. Constant-mesh, "instant-shift" transmission eliminates time-consuming stops for gear changing. No loss of rolling momentum. Torque converter available to automatically apply the engine's 186 h.p. most effectively and smooth out shock loads.

Tournadozer's 100% mobility means that you now can work or travel anywhere. Hauling costs and loading delays are eliminated. An assignment a half mile away can be started in just a couple of minutes from "now."

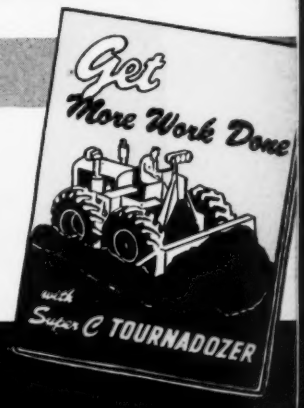
Tournadozer's high speed, job versatility and 100% mobility will take care of more job assignments per day with fewer units. Each assignment is more quickly completed. On many applications a single Tournadozer often does work of two, sometimes three, crawler dozers. On pusher service, Tournadozers complete loading faster, position for next push more quickly, can easily service a larger fleet of scraper units.

R. G. LeTOURNEAU, INC.

PEORIA, ILLINOIS

NOW!

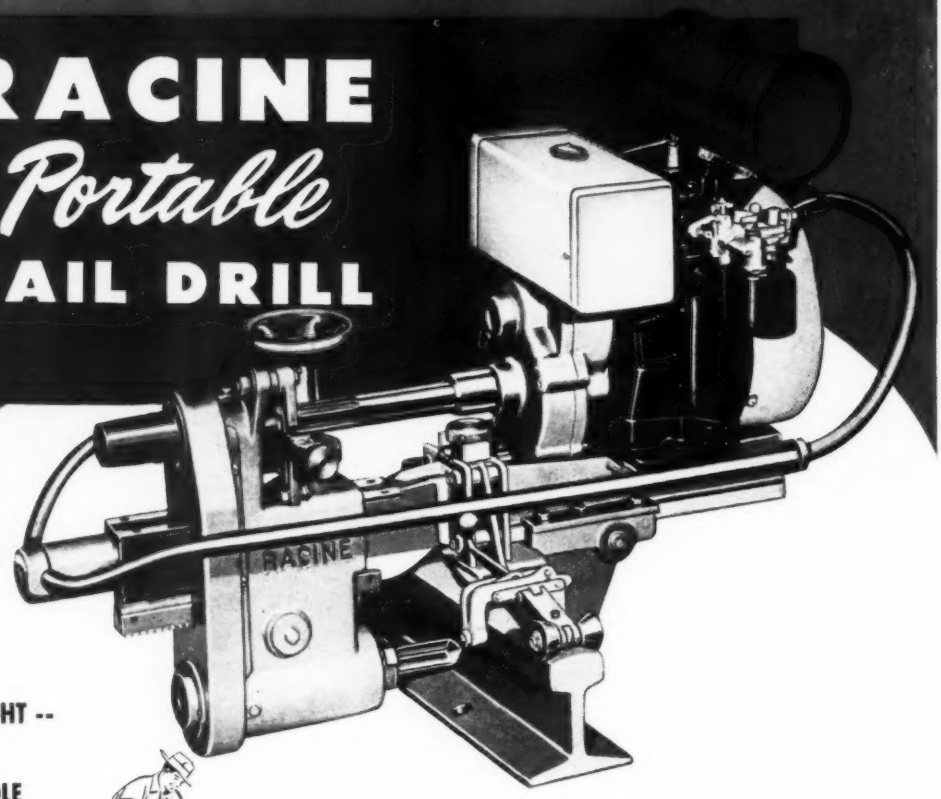
Write for bulletin giving specific description of TOURNADOZER and reasons why it can get more work done faster on your railroad



• HAULING • LIFTING EQUIPMENT

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE *Portable* RAIL DRILL

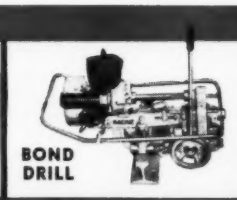


- LIGHT IN WEIGHT -- 165 lbs.
- EASY TO HANDLE
- POWERFUL -- FAST
- FITS ALL RAILS
- AUTOMATIC POWER FEED

See this modern, gas-engine powered rail drill. A machine built to machine tool precision standards. It is a rugged, accurate drill press on horizontal lines.

Light in weight, mounted on rollers, without outboard supports, this machine can be handled and operated by one man. Husky, quick-acting clamps hold the machine securely on the rail and provide quick removal to clear traffic. Finished holes can be produced in one to two minutes depending on drill size and web thickness. Handles all size drills. Special type *automatic power feed* insures a predetermined drilling time per hole. Definite output per man-hour can be established. Write today for Free 3-color catalog.

OTHER PORTABLE MACHINES BY RACINE



RACINE TOOL AND MACHINE COMPANY
1738 State Street — Racine, Wis.

STANDARD FOR QUALITY AND PRECISION
RACINE
RACINE TOOL and MACHINE CO.

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE *Unit* TIE TAMPER

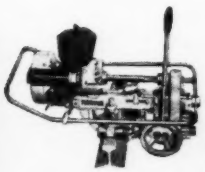
If you had an extra man working eight hours per day, you'd notice the increase in tamped track. A Racine Unit Tie Tamper provides that increase — GIVING YOU THE EQUIVALENT OF EIGHT HOURS MORE WORK EVERY DAY.

Racine Unit Tie Tampers speed up your work and increase manpower efficiency by reducing fatigue. Easily carried, easily operated, shock-free — they team up productively with your operators.

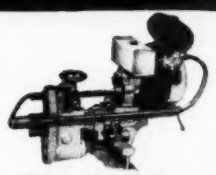
You get longer tool life with less machine maintenance, more uniformly compacted ballast that remains properly placed longer. All these are extras that make the Racine Unit Tie Tamper a valuable employee to serve you capably for a long, long time. Write for free 3-color catalog.

- *LIGHT IN WEIGHT (60 lbs.)*
- *SHOCK-FREE OPERATION*
- *1500 BLOWS PER MINUTE*
- *EASY STARTING MAGNETO IGNITION*
- *BALANCED RECOIL—SMOOTH ACTION*
- *LOW MAINTENANCE COST*
- *80% IMPROVEMENT IN TOOL LIFE*
- *LONG TROUBLE-FREE LIFE*

OTHER PORTABLE MACHINES BY RACINE



Racine Bond Drill



Racine Rail Drill

Racine Rail Cutter

RACINE

TOOL AND MACHINE COMPANY

1738 State Street, Racine, Wis.

80% of our exhibit space devoted to machines developed in the last four years

NEW FOR '52

"GANDY" . . . for pulling and inserting ties and for handling material

"DUNRITE" TRAKGAGER . . . gauges the tie plates (Seeing is believing). See them in BOOTHS 7-S to 20-S

It will pay you to inspect the full line of modern, money-saving Nordberg track maintenance machinery that will be on display at the 1952 N.R.A.A. exhibit in the Chicago Coliseum, March 10-13, inclusive. This will be the most complete, operating exhibit that Nordberg has ever shown, with new and improved machines for meeting today's maintenance needs.

Why not make the Nordberg exhibit *your* headquarters at the show? *We'll be looking for you in BOOTHS 7-S to 20-S, in the south end of the Coliseum.*

R252

Look to NORDBERG

. . . *for continually improved* TRACK MAINTENANCE MACHINERY *to do a Better, Faster Maintenance Job at Lower Cost*

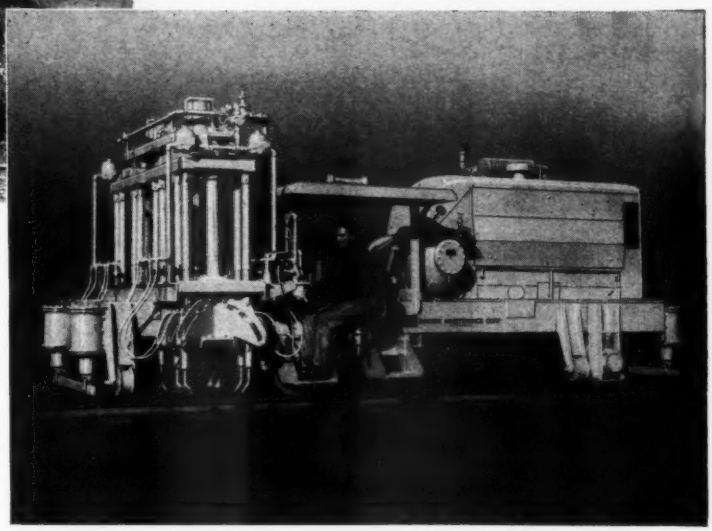
NORDBERG MFG. CO., Milwaukee 7, Wisconsin

McWilliams..

pioneers in the development of M W equipment

McWilliams Super Mole

Off-track shoulder ballast cleaning machine. 800 to 3000 feet per hour at cost of 3 to 3½ cents per lineal foot of shoulder.



McWilliams Tie Tamper

The only tamper that positively compacts the ballast under the rail. Operates with all the weight of the machine on tamped track. Independent control of tamper groups over each rail.

NATIONAL RAILWAY APPLIANCE ASSOCIATION SHOW

Chicago—March 10 - 13 Booths 121-122-123-124-125

Railway Maintenance Corp.

P. O. Box 1888 Pittsburgh, Pa.

Designers and Manufacturers of: Moles; Super Moles; McWilliams Crib Cleaners; (RR) Track Raiser and Air Tampers; McWilliams Multiple Tool Air Tamper; R.M.C. Rail Joint Packing.

On Display in Booth 7-N
N.R.A.A. Exhibit, Chicago

Pneumatractor

THE SCHRAMM AIR COMPRESSOR THAT WILL

- **PUSH** Anything a wheel tractor will push
- **PULL** Anything a wheel tractor will pull
- **POWER** Anything a wheel tractor will power
- **PROVIDE AIR**

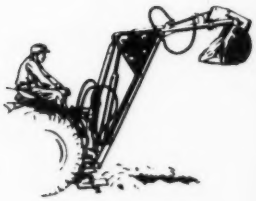
for every compressed air job! For full details on the versatile Schramm *Pneumatractor*, write today for Free Literature.

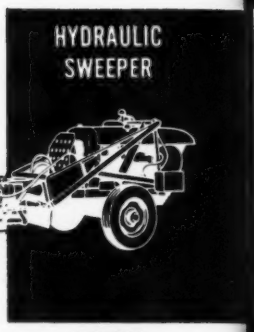
SCHRAMM INC.

The Compressor People

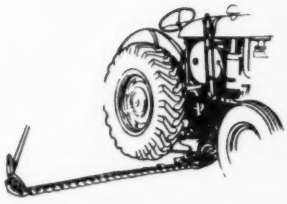
WEST CHESTER, PENNSYLVANIA

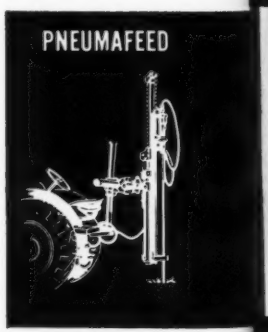
PIPPIN BACK HOE



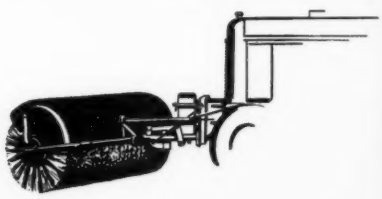


MOWER

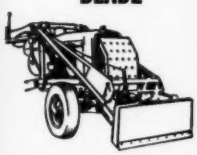




ROTARY SWEEPER

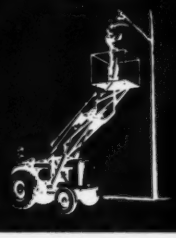


5' BACKFILL BLADE

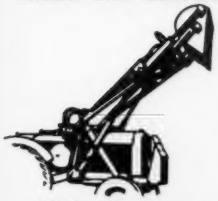


(Mechanical)

SCAFFOLD

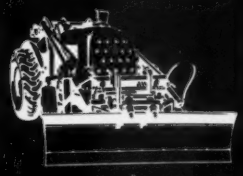


FRONT END LOADER



(Hydraulic Dump)

7' BACKFILL BLADE

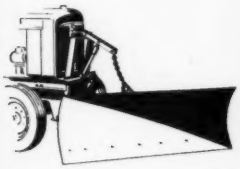


(Hydraulic Angling)

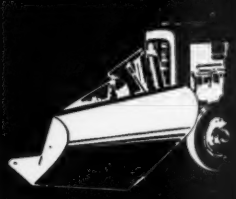
8' BOOM

TOWING TRAILER

SNOW PLOW REVERSIBLE

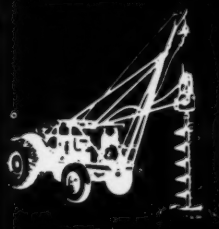


SNOW PLOW V-TYPE



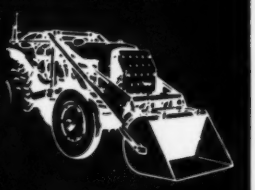
POST HOLE DIGGER

EARTH AUGER

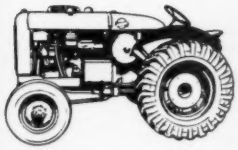


OTTAWA BACK HOE

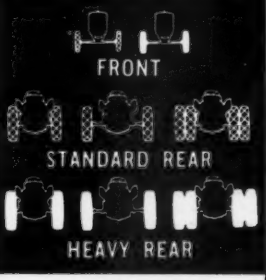
SNOW BUCKET



HYDRAULIC STEERING



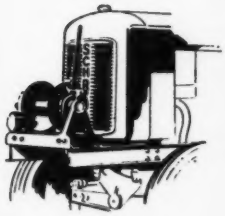
WHEEL ARRANGEMENTS



OPERATORS CAB

REAR WINCH

FRONT WINCH



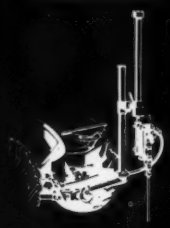
"A" FRAME

SPRAY PAINTING

PNEUMADRILL

ROCK DRILLING

PNEUMAJACK



CLAY SPADING

BACKFILL TAMPING

PNEUMABREAKER

CONCRETE BREAKING

DRIVING SHEETING

TIMBER SAWING

PNEUMADRIVER

AND A 1000 OTHER USES

•

SCHRAMM INC.

WEST CHESTER

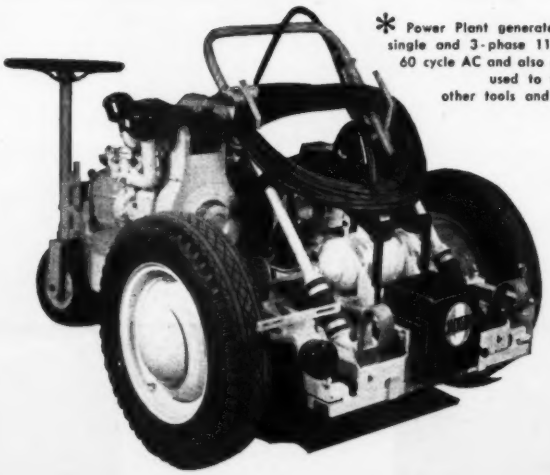
PENNSYLVANIA

A Sensational Compactor of ASPHALT, ROCK-FILL and GRANULAR SOILS

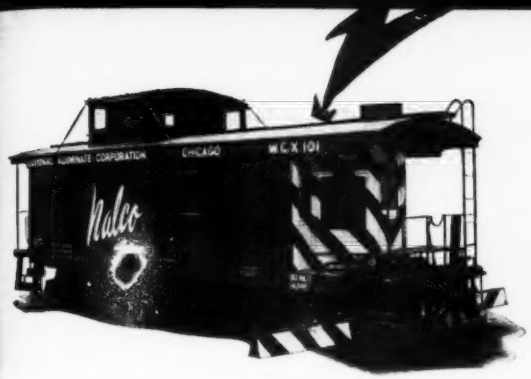
It's faster, more mobile and more convenient than larger more expensive equipment for the compaction of asphalt in station platforms, street crossings and between rails in city streets. Equally advantageous in the compaction of rock-fills and granular soils in concrete floor sub-bases, bridge approaches, in trenches, close to footings etc. The Jackson Vibratory Compactor delivers up to 4500 1¾-ton blows per minute. It propels itself and will firmly compact 900 to 1200 sq. ft. per hour, closely approaching the theoretical density of the asphaltic mix being used; or, in the case of granular soils, 95 to 100% of maximum density as determined by accepted laboratory testing methods (A.A.S.H.O. T99-38, Cone, Vibratory Table). It operates on 3-phase, 110 v., 60 cycle AC from a *Jackson Power Plant mounted on an auto trailer equipped for quickly picking up and lowering the compactor. (Skid-mounting of Power Plant is optional.) Write for the complete facts concerning this relatively inexpensive compactor. It does a job that is unexcelled by equipment at any price and is a tremendous time and money saver.

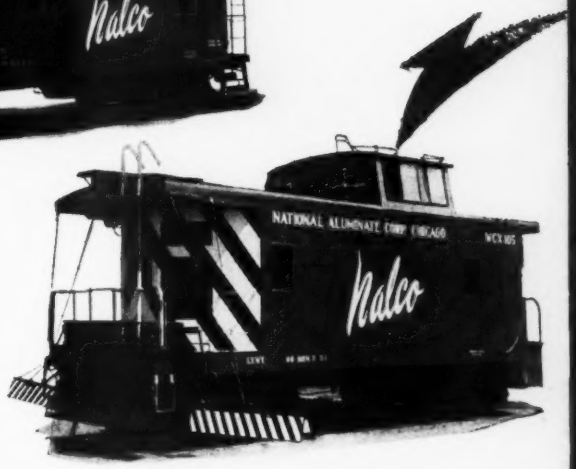
SEE IT AT THE RAILWAY SHOW AT THE COLISEUM, CHICAGO

JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN



* Power Plant generates both single and 3-phase 110 volt, 60 cycle AC and also may be used to operate other tools and lights.





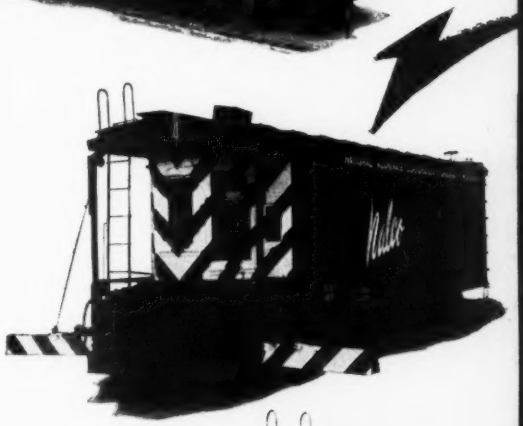
6 MORE REASONS for *Nalco* COMPLETE WEED and BRUSH CONTROL

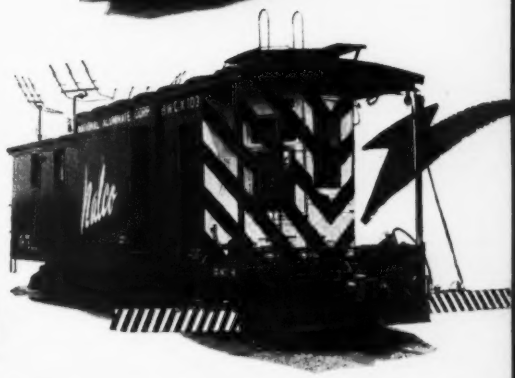
Nalco Spray Cars, engineered to give precision chemical dosage and coverage, are added good reasons for using safe, powerful Nalco weed and brush control chemicals on your right-of-way.

Several Nalco formulas are available . . . specifics for grasses, weeds, annuals or perennials, and Nalco spray cars are equipped to spray two formulas simultaneously, when necessary, in correct proportions for effective control. Spray cars, each with precise metering and indicating equipment, are available without charge to railroads using Nalco weed control chemicals in tank car lots.

Write for data on spray car availability and Nalco chemicals to keep your right-of-way free of weeds and brush.

NATIONAL ALUMINATE CORPORATION
6191 West 66th Place • Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario



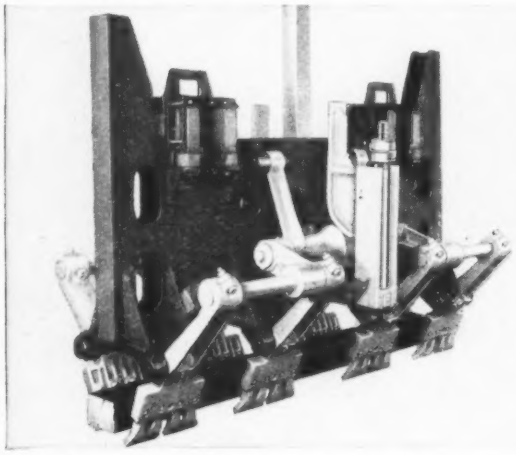


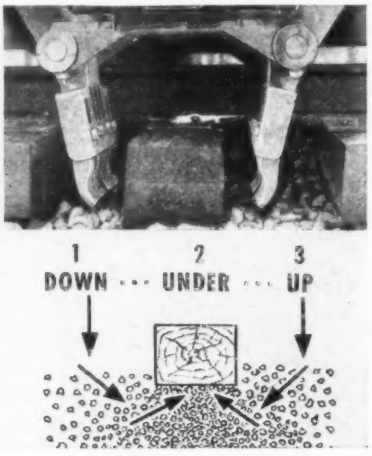
THE *Nalco* SYSTEM • Serving Railroads through Practical Applied Science

Six Nalco Spray Cars shown above have all gone into service within the past two years. Modern design, equipment and instrumentation assure maximum spraying control and labor-saving efficiency.

Seasonal Floods—which shut off traffic, resulted in a decision to raise this track above the high water mark of the worst flood. The Power Ballaster's ability to tamp track effectively during cold weather, even when ballast is "frosted", made it possible to raise the track six feet in a series of 6″ raises during the winter months of 1950-51.

In addition, the Pullman-Standard Power Track Ballaster has a high-running speed of 25 m.p.h. Its ability to efficiently tamp all types of ballast (the C. & E. I. uses gravel, stone, and slag, and operates much single track mainline) made it particularly effective in meeting this extended work season's requirements, economically.





Triple-Action Compaction is one secret of the Power Ballaster's ability to produce better, longer-lasting track. *Left:* The drop-head assembly applies tamping force equally to all tamping bars and delivers 36 complete tamping strokes a minute. A free-falling drop-head combined with cam action provides a tamping force which increases throughout the tamping stroke and produces maximum ballast compaction under the tie. A readily made adjustment regulates the depth reached by the Power Ballaster's controlled compaction—applies maximum tamping force exactly where wanted. *Upper right:* Because the Power Ballaster has 32 tamping bar positions and five different sizes of quickly interchangeable tamping bars, the Power Ballaster: (*a*) is a universal machine, (*b*) produces an under-tie-and-rail area of compaction fully meeting A.R.E.A. specifications, and by the methods specified by the A.R.E.A. *Lower Right:* Diagram shows triple-action compaction.

HERBERT HUFFMAN, *Engineer-Maintenance*, C. & E. I., tells why The Chicago & Eastern Illinois Railroad, after investigating many tamping methods and types of equipment, selected the Pullman-Standard Power Track Ballaster. (*See next page*)

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ROAD & TRACK EQUIPMENT DIVISION

BIRMINGHAM • CLEVELAND • PITTSBURGH • NEW YORK • WASHINGTON • SAN FRANCISCO • **79 EAST ADAMS STREET**

Pullman-Standard POWER BALLASTER

The "open season" for economical, fast tamping can be extended when Power Ballasters go to work. In spite of "frosted" ballast or other weather conditions, which hinder or stop most methods and equipment, these Pullman-Standard made units keep right on setting tamped-footage records . . . and equally important, the Power Ballaster is *one* production tamper which produces under-tie ballast compaction fully meeting the A.R.E.A. specifications.

stretches work season

Owners and prospective owners of Power Ballasters benefit from Pullman-Standard's continuing development and improvement program. Operating performance under all ballast and raise conditions are field-studied each work season by Pullman-Standard's engineers. These studies lead to design and construction developments which result in even further improvement in the Power Ballaster's operation. They bring about additional reductions in maintenance and labor requirements.

for the C. & E. I.

It's easy to prove the time-and-money-saving advantages of the Power Ballaster while tamping your own ballast. The Pullman-Standard Power Track Ballaster is available by: (1) outright purchase; (2) rental for 90 days, with option to buy; (3) straight rental for a minimum period of three months; (4) deferred quarterly payments over a period of 1 to 3 years. The rentals and deferred payments are established at substantially less than the realizable savings accruing during the payment periods.

C&EI

"After an investigation of tamper equipment we invested in the Power Ballaster for these six reasons: One, we learned that it had a travel speed of 25 m.p.h. to and from the job. Two, the Power Ballaster had special mechanism permitting easy set-off in 3 to 5 minutes. Three, it had unusually high footage output between train interruptions, especially good on single track. Four, it could handle all types of ballast. Five, and very important, it needed only a small labor force. Six, it produced high quality, long-lasting track."

Here's what YOU can expect from the POWER BALLASTER:

Triple-Action Compaction—Tamps down, then under, then up—for an under-tie ballast foundation that fully meets A.R.E.A. standards.

Low Labor Requirement—Easily handled with as little as two 5-man gangs.

High Production at Low Cost—475 to 675 feet of tamped track per hour often pays for the Power Ballaster in one season.

Versatility—Tamps raises from 0" to 8" on rail of any weight, with any ballast.

Maximum Use of Track Time—Powered set-off mechanism permits 4 men to make lateral set-off in 3 to 5 minutes . . . 25 m.p.h. speed for fast runs to siding, crib or work locations.

Meets A.R.E.A. Specifications—Fully, and by the methods specified by A.R.E.A.

PULLMAN INC.,

-STANDARD CAR MANUFACTURING COMPANY

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Another famous
BIG PRODUCER...

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Can you match Inland Steel's performance in materials handling?

If yours, too, is *big production* business, why not profit by the experience of Inland Steel? Here, big jobs involve big money; and the systems that stay are those that deliver *highest production*.

This year Inland expects to produce about 4,500,000 tons of ingots. To handle the heaviest lifting jobs connected with that output—to handle scrap, ore, limestone and coal within the 650 acre works at Indiana Harbor—Inland depends upon American Locomotive Cranes.

Why? Because American Locomotive Cranes can move loads that lighter equipment couldn't budge. Because they can swing, lift and travel all at once. Because their upkeep cost is unbelievably low. Because they are *completely modern* one-man machines, as different from early steam cranes as the jet plane is different from the Jenny.

Before you buy any lifting, loading or switching equipment, get comparative figures on American Locomotive Cranes. For big production, they are *always* your best buy!

Modernize...economize...with

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AMERICAN LOCOMOTIVE CRANES

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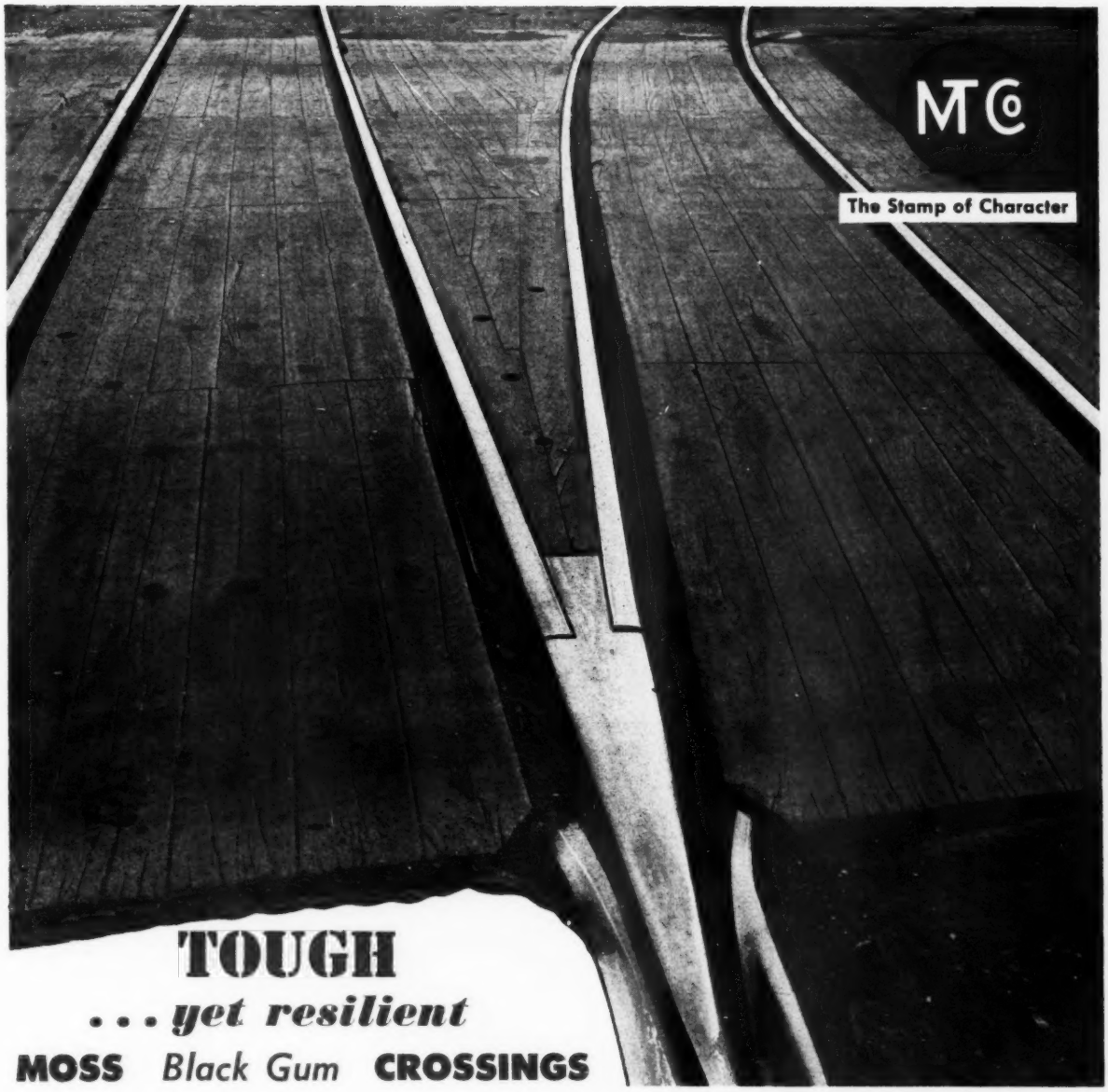

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. . . *yet resilient*

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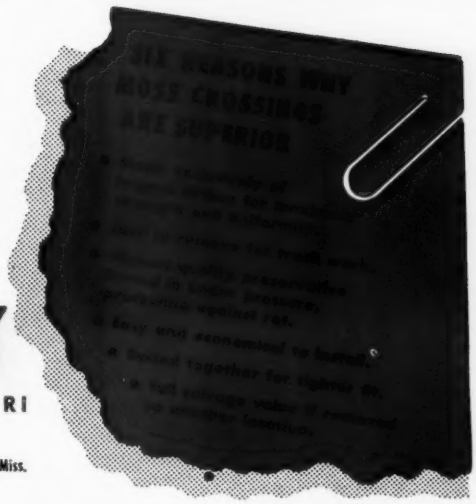
Next time, order Moss Creosoted Timber Crossings. Further information and prices gladly furnished on request.



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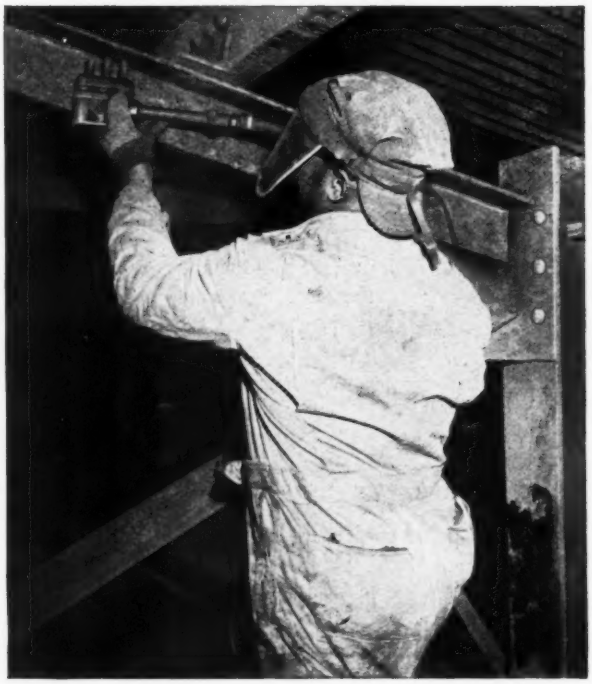
Cost-Cutting Tools FOR BRIDGE BUILDING

Tough scaling jobs are handled quickly with the air-powered CP Triple Scaler — weighing only 7¼ pounds. No chisels are required, as the pistons act as chisels, hammering old paint, rust or scale without damaging the underlying surface.



Designed for drilling holes in masonry, concrete and stone up to 1¼ inches in diameter, the 7½-pound, air-powered CP-9 self-rotating Handril does the same work as non-rotating hammer drills of triple its weight. Readily operated with one hand, even for up-drilling. A specially designed chuck makes it easy to change steel. The same chuck handles non-rotating chisels.

Loose scale is rapidly removed from any metal surface with air-powered CP Wire Brush Machines. Models, with either straight or pistol grip handles, are available with a wide choice of radial and cup wire brushes.

AND MAINTENANCE-OF-WAY

The CP-220 Hicycle Electric Concrete Vibrator can be operated anywhere in a 400-foot radius, without stopping to move the portable gasoline generator. Built for one-man operation. The vibrator motor is in the head of the tool; there is no flexible shafting.

Designed for concretes of 2" slump and over; walls, footings, columns, floor and roof slabs; precast piles and similar products. Capacity of 30 to 40 cubic yards an hour.

The powerful CP-365 Air Impact Wrench, with controllable rotary impact action, is unexcelled for fast, safe nut-running, and the application or removal of bolts, studs or lag screws. Absence of twisting or kickback, and little vibration, minimizes operator fatigue. Eight-inch extension shanks are available for screw spike driving.

The CP-20 Sump Pump operating at 40 pounds pressure against a 15-foot head, has a capacity of 200 gallons per minute. Operating at 80 pounds pressure against a 50-foot head, its capacity is 225 gallons per minute.

A single-stage centrifugal pump that requires no priming, it starts pumping instantly when air is turned on and the unit lowered into water.

Perfectly balanced, requiring no riding, easy to hold, the CP-117 and CP-118 Cut Spike Drivers will drive any cut spike in a few seconds.

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Precision Action

CLEANS DITCH BOTTOM WITHOUT DESTROYING SODDED SLOPES!

HERE'S HOW a major railroad uses one of its several Gradalls to cut costs on a rather routine—but never ending—job.

With extreme accuracy, the Gradall cleans this 7½ foot drainage ditch without harming sodded slopes or disturbing the surrounding area. Completely replacing the hand labor previously required, the Gradall did the job quicker, more accurately, and at less cost.

Many similar excavating jobs—close to curbs, sidewalks, tree lawns, buildings, or around buried pipe or tanks—ordinarily require hand work in addition to machines. But the Gradall's positive down pressure and arm action insures such accuracy and neatness that hand labor is eliminated on nearly all such jobs.

The Gradall's remarkable precision, versatility, and maneuverability return big profits to construction men—cut costs for railroads and municipalities.

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The 6 ft. wide, ½ cubic yard bucket starts its precision cut.

The hydraulic boom, working with the skill of a giant arm, takes a skim cut from the bottom of the back slope. The muck is cleaned from the bottom, and a skim cut taken from the lower end of the front slope—lifting it free without disturbing sod.

The Gradall swings around and wastes the muck.

The arm-action boom levels the waste evenly over the surface before returning for another cut.

GRADALL—THE MULTI-PURPOSE CONSTRUCTION MACHINE with Controlled Down Pressure

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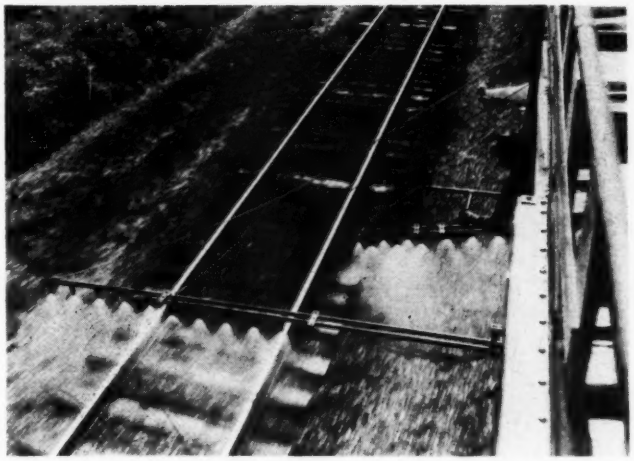

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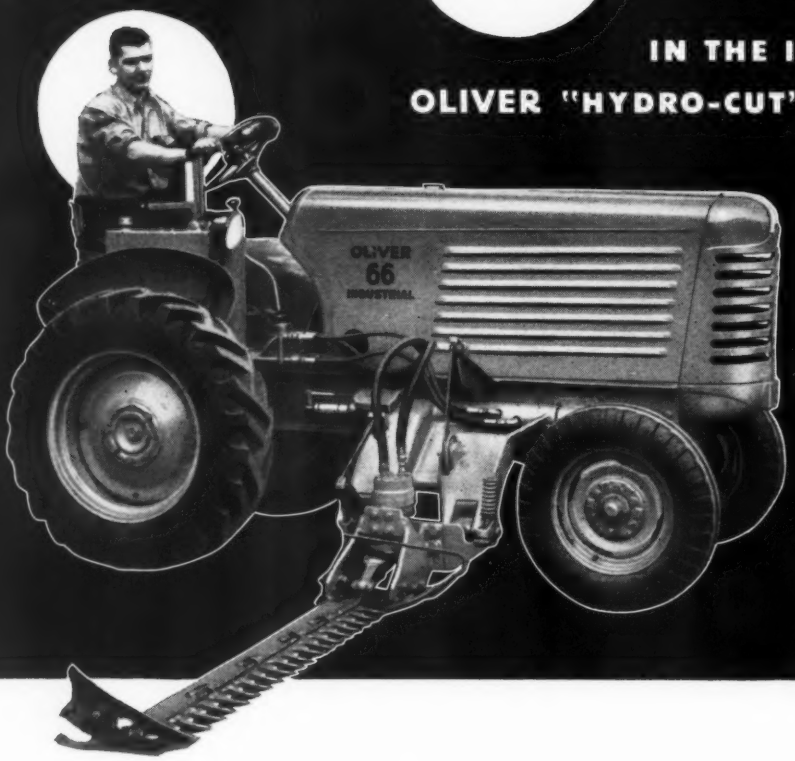
We Kept the Man in Mind

IN THE IMPROVED OLIVER "HYDRO-CUT" MOWER!



Operator comfort and convenience . . . simplified maintenance . . . these were the two big things we kept in mind in the improvements we made in the Oliver "Hydro-Cut" Mower.

Actually, our performance reports showed that, from an operating standpoint, our mower was tops in its class. The outstanding Oliver features—hydraulic driven cutter bar that cuts anything from thick matted grass to moderate brush . . . hydraulic drive that assures smooth, practically vibration-free operation . . . hydraulic safety mechanism that virtually eliminates knife damage . . . finger-tip hydraulic control for instant raising or lowering of cutter bar—are retained.

But, now, we've made life easier for the operator. There is no need for frequent oilcan lubrication of the pitman. Pressure lubrication at all required moving points is provided to eliminate need for frequent lubrication. Selective and frequent tightening of the pitman bearings is eliminated.

New hydraulic tank and controls are located for maximum operator convenience. One-piece carriage casting assures more protection for the sheaves and even further dampens vibration.

Don't Overlook these Cost-Cutting Combinations

A "Hydro-Cut" Mower can be quickly and easily installed in combination with a Loader, Sweeper, or Bulldozer using the same hydraulic pump to operate the combination unit.

For all the facts on the mower that really cuts mowing costs to the bone, see your Oliver Industrial Distributor or write The Oliver Corporation, Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio.

THE OLIVER CORPORATION

A Complete Line of Industrial Wheel and Crawlers Tractors

Cuts ballast cleaning time in half with help of TIMKEN® bearings

WHERE the track has been cribbed in advance, this Pullman-Standard Power Ballast Cleaner can pick up both the shoulder and crib ballast from either or both sides of the track simultaneously. The ballast is cleaned, screened, returned to the track, and distributed as desired at a rate of approximately 1000 ft. per hour . . . twice as fast as former models.

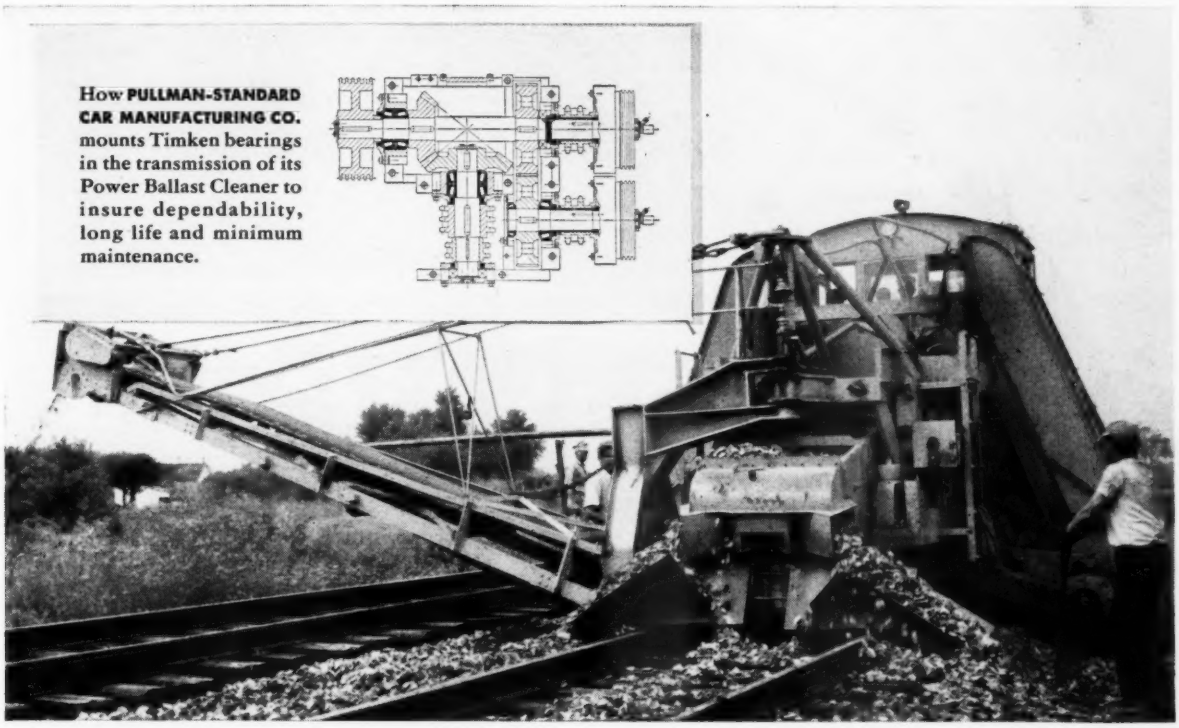
One of the ways Pullman-Standard Car Manufacturing Company provides for dependability, long life and minimum maintenance in its Ballast Cleaner is by mounting vital parts on Timken® tapered roller bearings. Timken bearings are used in the digger assembly, the transmission and on the front and rear axles.

Because of their tapered construction, Timken bearings take radial and thrust loads in any combination. Shafts are held in rigid, positive alignment, eliminating excessive wear on moving parts. And wear within the bearing itself is minimized because true rolling motion and smooth surface finish of rollers and races practically eliminate friction. As a result, track maintenance crews can count on top performance with minimum time-out for Ballast Cleaner repairs.

No other bearing can give you all the advantages you get with Timken bearings. Make sure you have them in the equipment you buy or build. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

How **PULLMAN-STANDARD CAR MANUFACTURING CO.** mounts Timken bearings in the transmission of its Power Ballast Cleaner to insure dependability, long life and minimum maintenance.



FINISHED TO CLOSER TOLERANCES

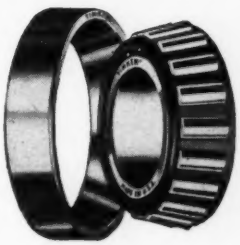
Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

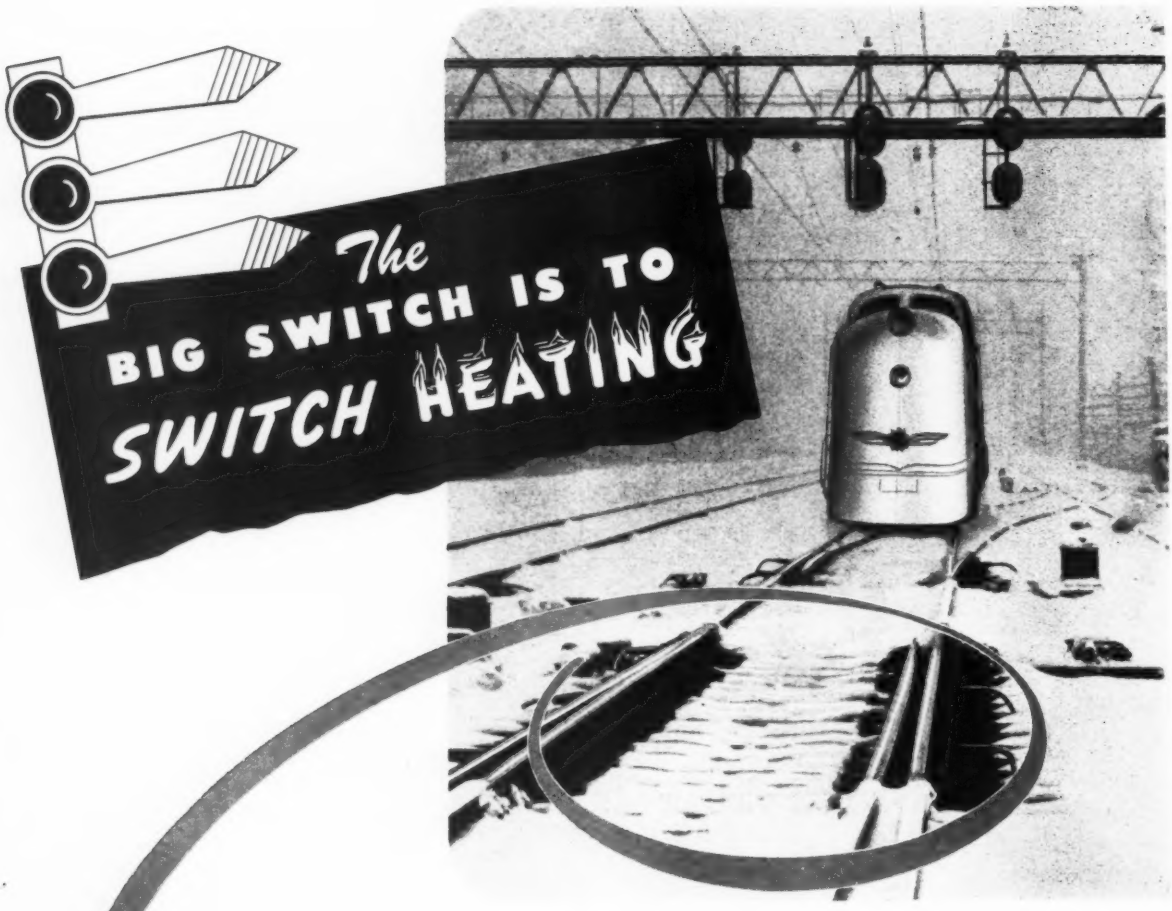
TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳



Switch Heating with Protane LP Gas has the enthusiastic approval of railway maintenance executives wherever it is being used. Its high efficiency, tremendous savings over other methods and automatic control have established its superiority. Records of installations currently in operation indicate savings ranging to 75% over older methods. For additional information on how switch heating with Protane LP Gas saves money and man hours, write to:

PROTANE
BOTTLED GAS SERVICE

THE PROTANE CORPORATION
ERIE, PENNSYLVANIA

9-Foot Snow Collapses Buildings in Coast Town
By the Associated Press
PORTOLA, Calif., Jan. 16.—This little railroad and lumbering town sought a declaration of emergency today because of a record snowfall that has collapsed buildings, stranded 118 bus passengers and made all emergency equipment useless.
Portola, Calif., Locked 3d Day In 9-Foot Snow
Town Digs Desperately as Buildings Cave In, Homes Sag; Buses Strand 118
PORTOLA, Calif., Jan. 16 (AP).—Desperate efforts were being made today to dig this mountain community out of a record snowfall which has collapsed buildings, caused one death, stranded 118 bus passengers and isolated the community for three days.

RAIL-TEL *Performance*

In Record Snowstorm

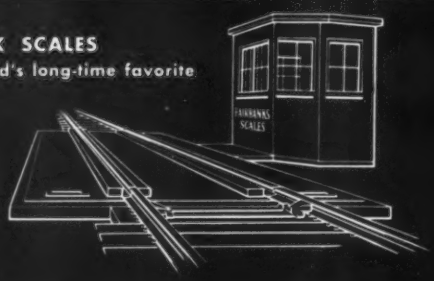
Above is an unretouched photo taken on the right-of-way of the Western Pacific at Portola, Calif. during the height of the snowstorm which buried this town under 9-ft. of snow. Here is a graphic illustration of the efficiency of Rail-Tel Propane Switch Heaters which are operated by remote control on the W. P. Incidentally, a Western Pacific emergency train carrying urgently needed supplies, was the first transportation unit to reach the beleaguered town in the high Sierras after the storm had abated.

Rail-Tel Switch Heaters, whether operated by manual or remote control, provide complete protection at all times and under all conditions. Many railroads are using these proved heaters for the economical and dependable protection of both isolated switches and all types of interlocking plants.

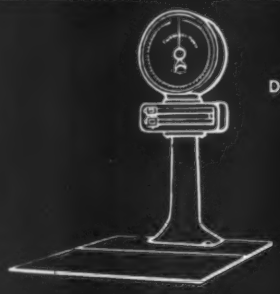
THE RAILS COMPANY

NEW HAVEN, CONN. HOBOKEN, N. J. ST. LOUIS, MO. CHICAGO, ILL.

TRACK SCALES
The railroad world's long-time favorite

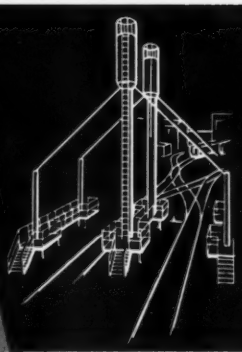


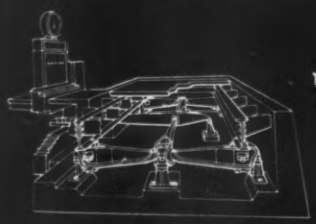
TURBINE PUMPS
Oil or water lubricated models



WAREHOUSE SCALES
Dial scales for warehouse weighing

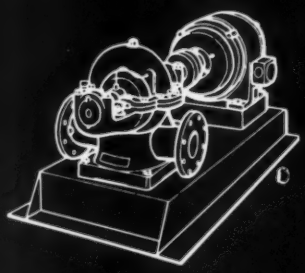
SAND STATIONS
with new, fast-action, easy-to-use sand nozzles.





TRUCK SCALES
True weight measurement for years of off-track operation

CENTRIFUGAL PUMPS
Also positive displacement types for fueling stations

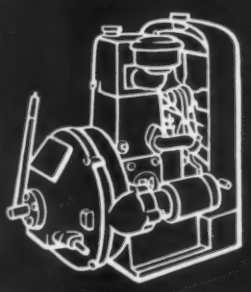


FOR COST-REDUCING RAILROAD EQUIPMENT...

FAIRBANKS-MORSE,

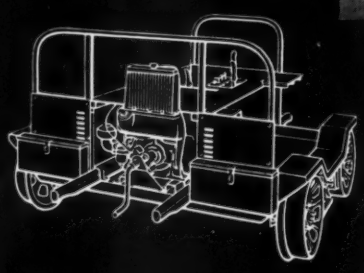
a name worth remembering

DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES
HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY • MAGNETOS

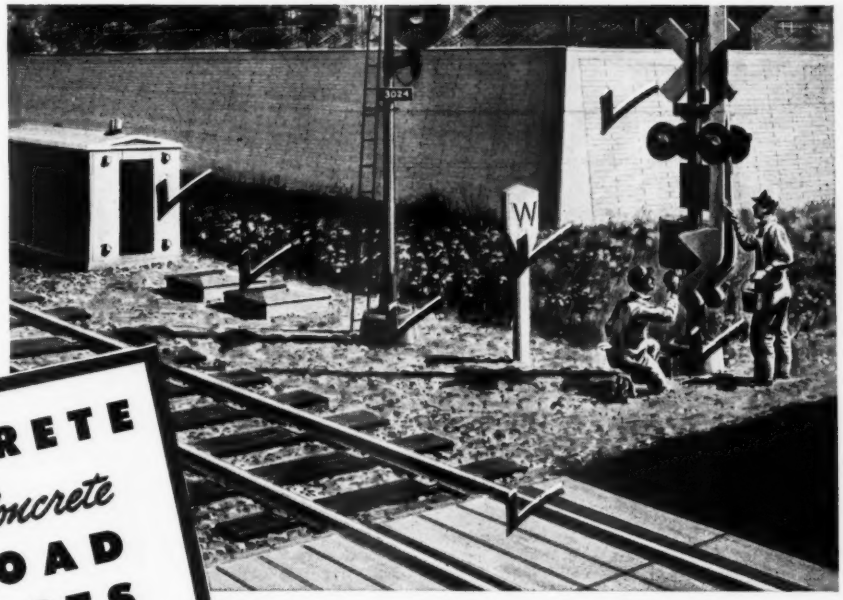


GENERATING SETS
Gasoline and diesel engine models

RAIL CARS
Complete gang and inspection equipment, including the new model 101 with immediate reverse and other safety features.



Check the permanence, superior performance, and lower in-place cost of these sectional concrete products when planning your '52 budget.



PERMACRETE *Precast Concrete* RAILROAD PRODUCTS

CRIBBING Tri-Crib units for open or closed face retaining wall construction for fills, cuts, bridge abutments and water front installations. Faces 6" high and 6' long. Headers and Stretchers cast in one unit to carry its own internal pressure.

CROSSING SLABS 6' long, 16¾" wide and from 5" to 8" thick in multiples of ¼". 2" steel armor channel is cast on top edge. The safest crossing yet devised for high-speed rail and highway traffic.

POSTS For right-of-way and farm fence, mile posts, elevation and junction posts, land line and cable location markers.

BUILDINGS-BOOTHS For greater fire and weather protection, lower in-place cost, sectional concrete buildings for signal, telephone, communications, and maintenance of way departments.

SIGNAL FOUNDATIONS For every type of signal installation, these sectional foundations are easy to install with hand labor only and afford greater stability.

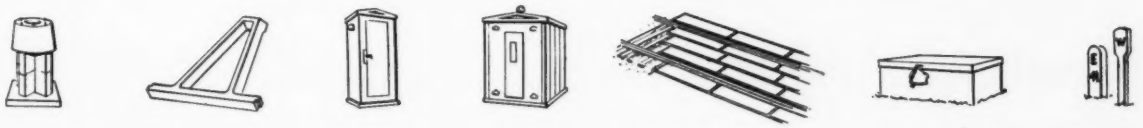
BATTERY BOXES Five light weight steel reinforced concrete sections, complete with slat bottoms, terminal boards, insulation, frost cover and steel cover. Sizes 12665, 12666, 12667, 12668. Also one piece Air Cell and Track Circuit boxes.

For 32 years, Permacrete sectional concrete railroad products have been used by leading railroads. Manufactured of high strength, quality controlled concrete, steel reinforced, these products have passed every test for permanence, stability and cost-in-place economy. The sections permit easy handling, shipping, storage, and field installation with a minimum of hand labor and time . . . without the aid of mechanical equipment. Permacrete products provide greater safety and years of dependable, maintenance-free service.

If you are interested in faster, more economical installations, send for complete catalog today.

PERMACRETE
PRODUCTS CORPORATION

COLUMBUS 7, OHIO



FOUNDATIONS CRIBBING BOOTHS HOUSES CROSSING SLABS BATTERY BOXES POSTS

THE MOST COMPLETE LINE OF SECTIONAL *Precast Concrete* RAILROAD PRODUCTS

THE BEST IN RAIL JOINTS

Less MAINTENANCE
Longer RAIL LIFE

The first T.R. Rail was laid on the C. B. & Q. in 1943. Up to the present time, over 1450 miles of this rail has been laid on their lines. *And this mileage is being increased in 1952.*

THE RAIL JOINT COMPANY Inc.
50 CHURCH ST. NEW YORK 7, N. Y.

Du Pont Ammate®
WEED KILLER

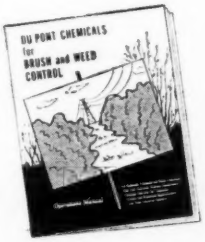
Keeps Brush Down With Fewer Sprays

LOWER COST TO KEEP BRUSH DOWN. Many users report "Ammate" sprays once every five years keep down the brush on their rights-of-way. And "Ammate" kills more kinds of brush and woody plants, roots and all, than most other weed killers.

SAVES LABOR AND EQUIPMENT. Fewer sprays—so maintenance crews can cover more ground on a long-term basis. "Ammate" develops efficiency in brush control.

PROVIDES SAFETY FACTOR. "Ammate" does not leave the soil unproductive, so grass and low growth come back to control erosion. With "Ammate" there is less danger of spray drift damage, for "Ammate" spray is not volatile.

KINGPIN FOR YOUR BRUSH-CONTROL PROGRAM. Use "Ammate" for general brush control. Du Pont 2,4,5-T, 2,4-D and TCA are recommended for certain brush or weeds which they control well.

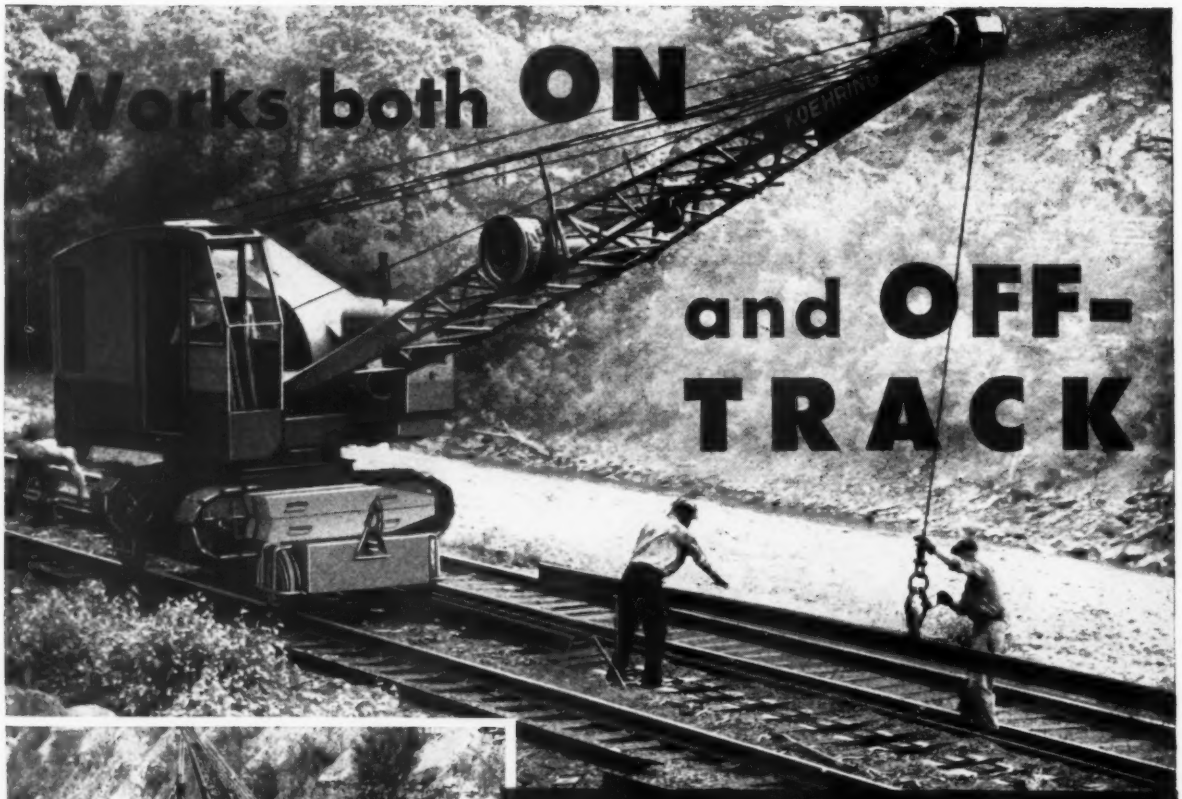


Get this free illustrated booklet *describing industrial brush control with Du Pont "Ammate" and other Du Pont brush killers. For further details, write:*

DU PONT, GRASSELLI CHEMICALS DEPT.
5031 DU PONT BLDG.
WILMINGTON, DELAWARE

DU PONT
REG. U.S. PAT. OFF.
Ammate®
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

Works both ON and OFF-TRACK



3 LARGER SIZE Koehring excavators have dipper capacities up to 2½ yards . . . lift capacities up to 79½ tons. Heavy-duty ¾-yard 304 (above) safely lifts from 13.9 to 25 tons, depending on crawler, rubber-tired cruiser or truck-type mounting.

SIMPLIFY TRACK-BED STABILIZATION —

Water or ballast pockets in track sub-grade are easily corrected with Koehring Mud-Jack®. Injection points are driven below ballast . . . hydraulic pump forces soil-cement slurry into weakened area, stabilizes existing support material, leaves firm, lasting sub-grade. Slurry can be forced over 70 feet deep for stabilizing fills at trestle ends. There's no interference with rail traffic. You save on labor, cut maintenance costs, reduce "slow orders".

SELF-PROPELLED RAILAID

- Saves extra cost of separate on and off-track cranes . . . combines all the advantages of a self-propelled track crane with the versatility of a standard crawler crane.
- Powers its own rail-propulsion car.
- Travels at 4 rail speeds up to 14.4 m.p.h.
- Loads or unloads itself on ramp-equipped propulsion car in less than 10 minutes . . . sets the carrier on and off track.
- Crane lifts 6.6 tons from carrier . . . has 8¼-ton lift capacity on ground. Standard 30-foot boom extends to 50 feet.
- Readily converts to magnet crane, clamshell, dragline, pile driver, ½-yd. shovel or hoe.
- Get the complete RAILAID story from your Koehring distributor, or send for bulletin.

KOEHRING COMPANY
Milwaukee 16, Wisconsin

ENTERPRISE

Multi-Service

BALLAST CAR

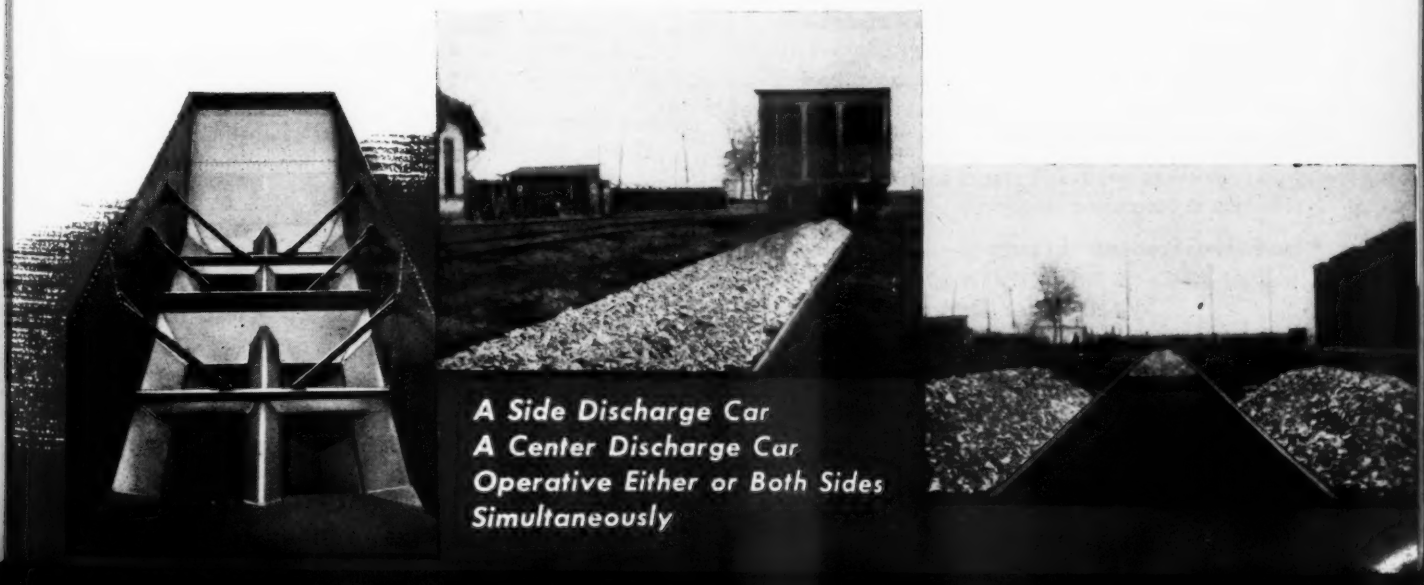
FOR BALLASTING OR COMMERCIAL SERVICE

Deposits ballast in place and quantity desired.
100% discharge.
Easy, one-man operation.
All ballast deposited clear of rails.
Reduces time, labor, and cost of ballasting.

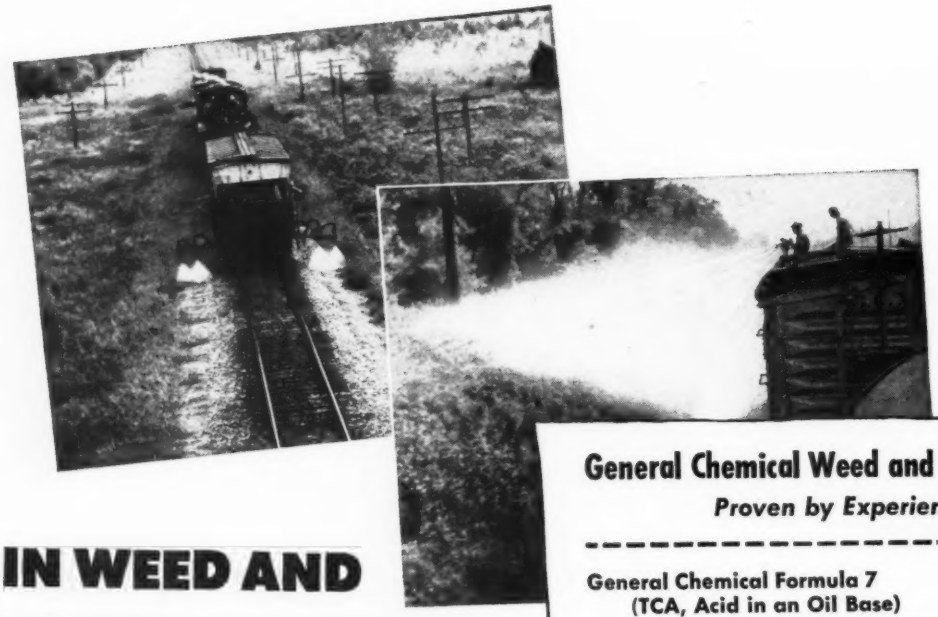
50-ton and 70-ton Enterprise Multi-Service Ballast Cars may be built by any car builder, the door operating mechanism being furnished by Enterprise Railway Equipment Company as a specialty.

ENTERPRISE RAILWAY EQUIPMENT COMPANY

59 East Van Buren Street • Chicago 5, Illinois



A Side Discharge Car
A Center Discharge Car
Operative Either or Both Sides Simultaneously



IN WEED AND BRUSH CONTROL

Only "Custom Service" CAN GIVE *REAL* RESULTS

NO ONE herbicide can be a "cure-all" for the widely varying weed problems encountered by railroads from coast to coast.

That's why General Chemical has developed its *"Custom Service"* railroad weed control program... the *only* method for really effective results.

General Chemical tailors its program to meet the needs of the individual road. It uses only modern organic herbicides which research and experience have proved most suitable for specific vegetative and climatic conditions. Applications are made according to a carefully-planned spraying schedule, under the supervision of General's weed control specialists.

THE RESULT: You can get clean track immediately with high kill of weeds and grasses and continuous reduction in perennial root growth.

For full information, write today to—

Weed Killer Department

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

General Chemical Weed and Brush Killers

Proven by Experience

General Chemical Formula 7
(TCA, Acid in an Oil Base)
- For general purpose grass control.
- Used with one of the additives listed for over-all control of weeds.

General Chemical Formula 7 with 2, 4-D
- For use where grasses predominate, but includes sufficient 2, 4-D to control moderate infestations of broadleafed weeds.

General Chemical Formula 7 B-D
- For control of very resistant weeds and grasses. The amount of 2, 4-D has been increased and fortified by Pentachlorophenol.

General Chemical Sodium TCA (Liquid Concentrate)
- For soil treatment of noxious grasses.
- For all-purpose weed control when used with one of the ester additives listed.

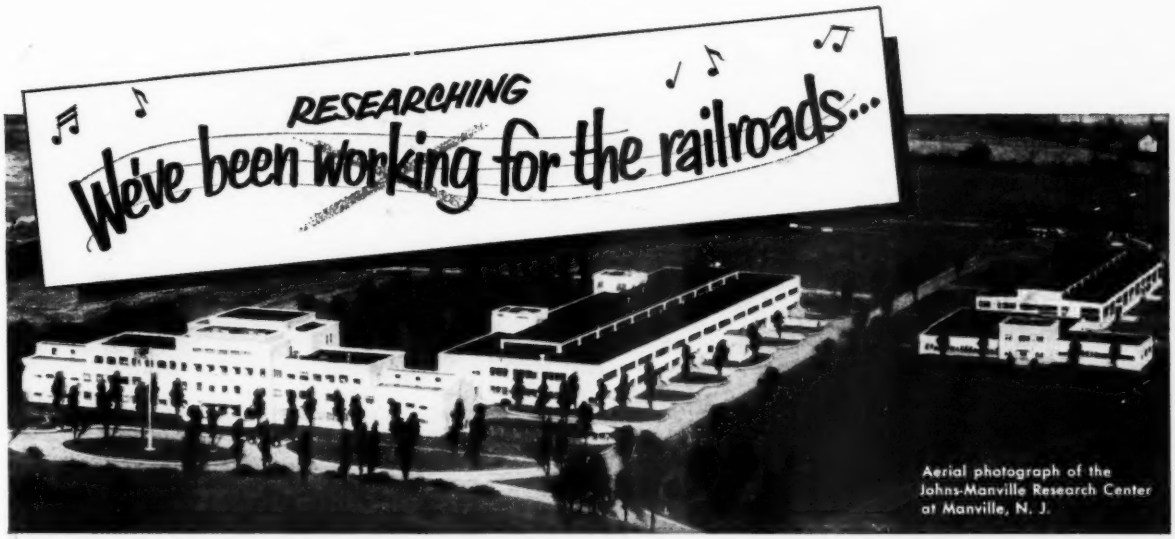
General Chemical Emulsible PCP—Aromatic Oil
- Low cost contact type weed killer for use where weed and grass control problems are not severe... contains pentachlorophenol.

General Chemical 2, 4-D Amine Additive
- Used in conjunction with General Chemical Formula 7 for all-purpose weed and grass control.

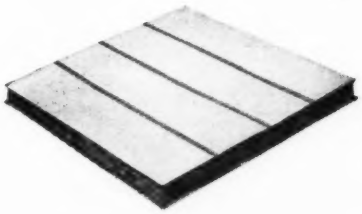
General Chemical 2, 4-D Ester Additive
- For use with General Chemical Formula 7 or Sodium TCA where cotton or other plants susceptible to 2, 4-D are not present.

General Chemical 2, 4-D—2, 4, 5-T Ester Brush Killer
(Water Soluble)

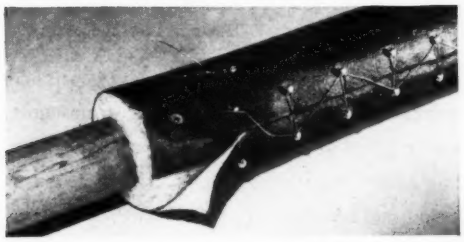
GENERAL CHEMICAL WEED CONTROL


RESEARCHING
We've been working for the railroads...
Aerial photograph of the Johns-Manville Research Center at Manville, N. J.

. . . to develop products like these that cut costs and improve passenger comfort



J-M STONEFELT INSULATION—One reason why passengers ride so comfortably on today's trains—regardless of the climate outside—is this specially designed J-M blanket-type insulation for passenger cars. Installed in the car superstructure, Stonefelt helps keep temperatures uniform at all times, muffles external noises down to a whisper. Its excellent insulating qualities also help cut air-conditioning and heating costs.

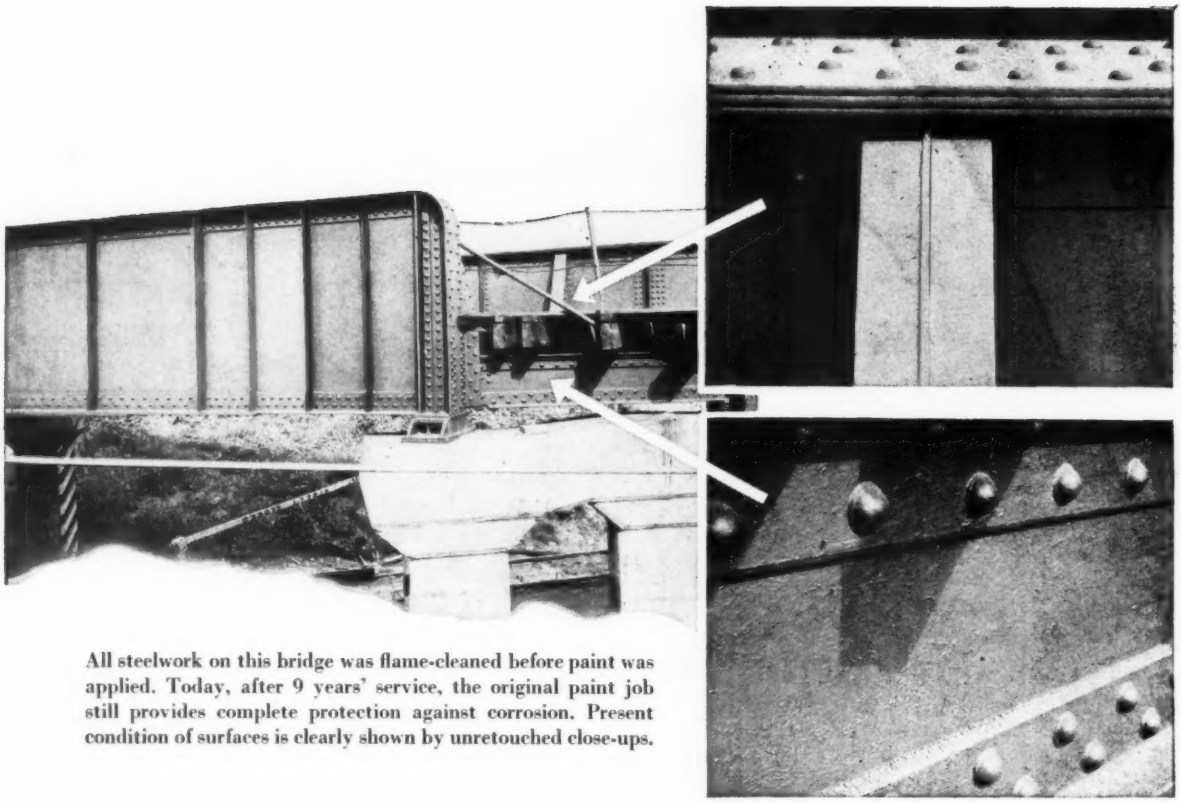


J-M THERMO-WRAP INSULATION—This improved lace-on-type insulation gives maximum protection to heating lines throughout the length of the train. It is easy to install . . . fits tight and stays tight. Its neoprene-coated jacket protects against abrasion, mechanical abuse, and moisture. And it withstands the impact of rain, sleet, snow and flying ballast. Can be applied on either curved or straight pipe.

J-M TERRAFLEX FLOORING—Here's a vinyl plastic asbestos floor tile that just won't give up in service. It is unusually resilient and soft under foot . . . yet it resists fire, scratches, greases, oils, alkalis and mild acids. Laboratory and wear tests have shown that it has two to three times the abrasion-resistance of standard asphalt tile.

For further information about these and other J-M products for the railroads, write Johns-Manville, Box 290, New York 16, N. Y.

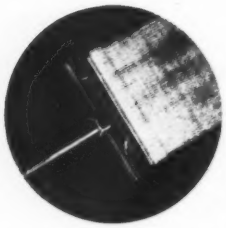
JOHNS-MANVILLE JM PRODUCTS **Johns-Manville** 94 YEARS OF SERVICE TO TRANSPORTATION



All steelwork on this bridge was flame-cleaned before paint was applied. Today, after 9 years' service, the original paint job still provides complete protection against corrosion. Present condition of surfaces is clearly shown by unretouched close-ups.

Your Steelwork . . .

How Will It Look in 1960?



Steelwork you coat with good paint today can still look like new ten years from now, *if you flame-clean all exposed surfaces first.* And what you'll save on maintenance, because of increased protection due to flame-cleaning, should more than pay for all the apparatus and materials you need for the job.

Flame-cleaning is simple to do, requires little equipment, and costs little. A brush of oxy-acetylene flames pops off scale and drives out moisture. Paint applied to the warm, dry surface goes on quickly and smoothly, bonds tightly, and lasts longer.

Flame-cleaning is only one of many time- and moneysaving OXWELD methods developed as a result of working with American railroads for more than a third of a century. So, whatever your problem, whether it's in the shop or out on track, there is a good chance that OXWELD know-how, show-how, and equipment can help you do it better, quicker, and at lower cost.

P. S. Send for additional information on flame-cleaning.

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

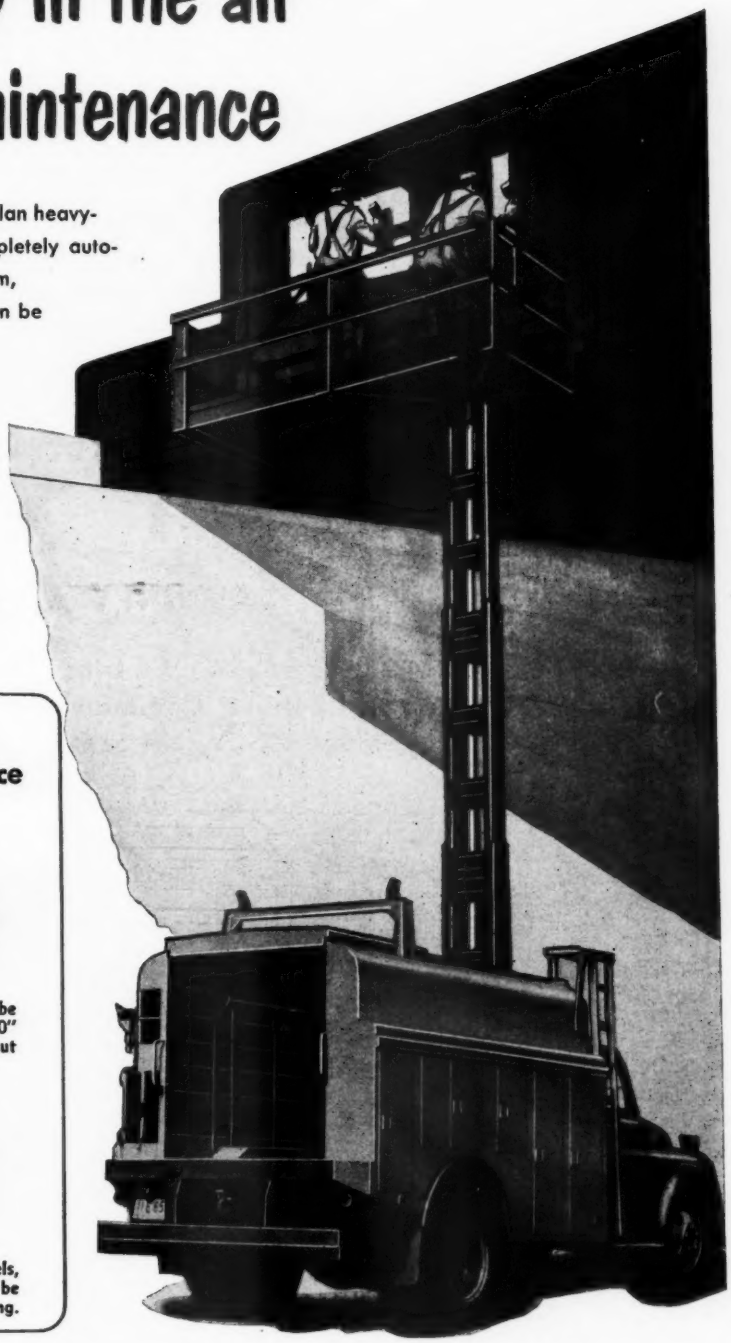
SINCE 1912 THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

The term "Oxweld" is a registered trade-mark of Union Carbide and Carbon Corporation.

When you're "up in the air" about bridge maintenance

Simplify "overhead" maintenance with the Holan heavy-duty hydraulic tower. This new tower is completely automatic with push button controls on the platform, in the cab or in the body interior. Platform can be raised to 30 feet and lowered to approximately 10 feet, 3 inches. On the model illustrated, the platform can be rotated 330 degrees.

This Holan hydraulic tower gives your men a working area approximately 20 feet wide for all heights to about 36 feet. When it is mounted with one of Holan's maintenance bodies, your crew has all necessary equipment and supplies right at hand.



Complete line of bodies for railroad maintenance and service

Holan construction and maintenance bodies can be mounted on any chassis with CA dimension from 60" to 120". All models can be furnished with or without a built-in crew compartment.

Holan general service bodies include open top models, low roof models and high roof models. They can be mounted on any chassis with ½ ton to 1½ ton rating.

The dependable name in Utility Bodies . . . **J. H. HOLAN CORPORATION**

BODIES and ACCESSORIES for UTILITIES

4100 West 150th Street Cleveland 11, Ohio

DISTRICT SALES REPRESENTATIVES

2754 N. 92 St.
Milwaukee 10, Wis.

6-03 161 St.
Beechhurst
Queens, N. Y.

DISTRIBUTORS

Baker Equipment Engineering Co.
Summit and Norfolk Streets
Richmond, Virginia

Baker Equipment Engineering Co.
2401 Hutchinson Avenue
Charlotte, N. C.

Schetky Equipment Corp.
1810 S. E. 10th Avenue
Portland 14, Oregon

PRECISION
Trackwork Combination

Matisa
BALLAST CLEANER

CLEANING... AS ONLY *Matisa* CAN DO IT

● Cleans *under* ties, as well as in cribs ● Permits *lowering* track profile as much as 18 inches ● One-man machine operation ● Off-track parking on lines in service ● Self-powered for cleaning and travel

Old methods of cleaning only shoulder and crib ballast had an excellent reason behind them: If ballast under ties was removed, there was no assurance that tie seats could be recompacted with any degree of precision.

Matisa has changed all that:

You can have existing ballast thoroughly cleaned—track profile re-established at a higher, or at a lower profile—then Matisa precision tamping to *guarantee* firm tie seats on a clean ballast cushion.

Details on Matisa Ballast Cleaner rentals and availability are yours for the asking. Write Matisa M. W. Engineering Department.

THE MATISA EQUIPMENT CORP.
224 South Michigan Blvd.
Chicago 4, Illinois

Matisa TAMPER

TAMPING . . . AS ONLY *Matisa* CAN DO IT

- ***Pressure*** **— not pounding action.**
- ***Vibration*** **for rapid and complete elimination of ballast voids.**
- ***Horizontal*** **tamper-shoe motions for positive tie-seat ballast support.**
- ***Independent*** **tamping control for either or both rails.**

You will get a new concept of what a tamper should be when you see the Matisa Tamper at work . . . automatically putting precision seats under ties up to 600 feet per hour . . . stabilizing a dipped rail joint properly raised on one side, without humping the rail opposite . . . compacting ballast to stay without pounding it to powder or damaging tie edges. And then take a look, or a ride on track tamped by Matisa years ago . . . as smooth now as the day it was tamped, with *settling averaging less than ¼-inch!*

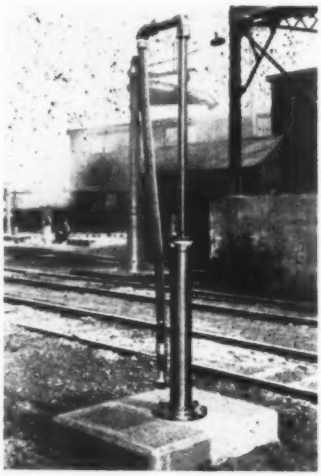
There are Matisa Tampers and Matisa-tamped track somewhere in your vicinity . . . Or we will be glad to show you motion pictures which will provide an extensive field trip in your own office. Write our M. W. Engineering Department for data.

Trackwork Specialists All Over the World

POAGE

Water Columns

for servicing Diesel locomotives



The POAGE DIESEL COLUMN, type No. 33, is designed with the following features to facilitate the servicing of Diesel locomotives: (1) The Poage Water Hammer Eliminator is incorporated in the valve chamber mechanism, preventing any damaging water hammer in the supply line after the valve is shut off. (2) The vertical column is self-draining immediately after use, eliminating the need for frost boxes. (3) The Poage Diesel Water Column has been operated in subzero temperatures with continuous satisfactory service.

POAGE

Water and Oil Couplings

for servicing Diesel locomotives

The POAGE DIESEL WATER and OIL COUPLINGS are so designed that it is impossible for an operator to fill oil in the water reservoir or vice versa. Cast from a special aluminum alloy, they are resistant to rough handling, yet are light in weight. They require no tools whatever for attaching to locomotives. Tail sections swivel free inside coupling heads to prevent twisting or kinking of supply hose.

We invite your inquiry

RAILROAD PRODUCTS COMPANY

1551 Queen City Avenue

Cincinnati 14, Ohio

U. S. DEPARTMENT OF COMMERCE
Charles Sawyer, Secretary

BUREAU OF THE CENSUS
Roy V. Peel, Director

FACTS FOR INDUSTRY

FOR RELEASE: September 24, 1951 — SERIES: M31L-00

INTERNAL COMBUSTION ENGINES
(EXCEPT AUTOMOTIVE AND AIRCRAFT)
1950

WISCONSIN *Air-Cooled* ENGINES AGAIN TAKE FIRST PLACE!

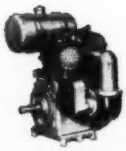
Here's proof of Wisconsin Heavy-Duty Air-Cooled Engine preference . . . again based on latest U. S. Bureau of Census statistics.

According to these figures covering ALL carburetor type internal combustion engines, a total of 566,777 engines of 11 to 175 cu. inches displacement were produced and shipped by 41 different manufacturers to other companies during 1950. (This does not include automotive and aircraft engines or so-called "captive" engines built and incorporated into the equipment of the same company.)

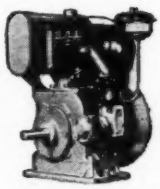
Of the total of 566,777, Wisconsin Motor Corporation figures show that 206,737 were produced by this company, or 36.4% of the total in the specified H.P. range. The balance of 63.6% was divided among 40 other engine builders.

These figures are significant because they again offer outstanding proof of preference for Wisconsin Air-Cooled Engines by power equipment builders, distributors, dealers and users of power-operated machines and engines.

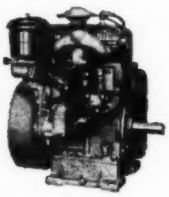
Let us put you in touch with your nearest distributor and also supply you with descriptive data.



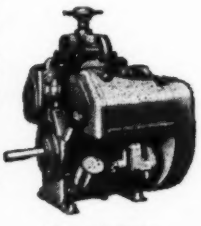
4-cycle single cylinder Models 3 to 6 hp.



4-cycle single cylinder Models 6 to 9 hp.



2-cylinder models 7 to 13 hp.



V-type 4-cylinder models 15 to 30 hp.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46 WISCONSIN

4 JUMPS AHEAD OF COMPETITION...

Yes, the Universal Frog for yard service is built better 4 ways . . .

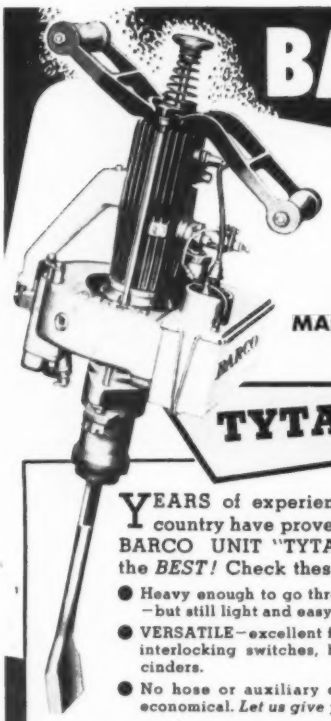
- It is made of an alloy electric cast steel that adapts itself to low cost electric or oxy-acetylene welding in track or shop.
- Tie plates are cast integral with the Universal Frog—an exclusive!
- Rail supports are cast integral on both ends of the Universal Frog —another exclusive!
- One-piece construction — no loose joints. Eliminates extra parts and cuts down maintenance costs.

HERE'S PROOF: Compare the cross sections of the Universal Frog with conventional types. Note the improved type rail joints, the patented supporting shelf, integral tie plates and rib construction.

Visit us at Booth No. 4-N in the Coliseum at Chicago March 10 to 13.

3/8" RIB IN CENTERS OF ALL INTEGRAL TIE PLATES

BARCO



LOW FIRST COST!

LOW MAINTENANCE COST!

TYTAMPER

YEARS of experience throughout the country have proved the superiority of BARCO UNIT "TYTAMPER" — It's still the *BEST!* Check these points:

- Heavy enough to go through cemented ballast —but still light and easy to handle.
- VERSATILE—excellent for work on cross-overs, interlocking switches, breaking ice or frozen cinders.
- No hose or auxiliary equipment. Low cost, economical. *Let us give you the complete story.*

BARCO MANUFACTURING CO.
1805 Winnemac Ave. • Chicago 40, Illinois

WATER

FROM THE GROUND BELOW YOU

IN single or multiple units, Layne well and pump installations produce tremendous quantities of water at extra low cost. High efficiency designing, precision building and advanced methods of installation make Layne wells and pumps a highly practical and fully justified investment. Layne does the job complete; drills the wells, furnishes all casing, shafting, pumps, motors and sand screen. After complete testing, the system is delivered to you in perfect operating order.

For further information, catalogs and engineering data, address

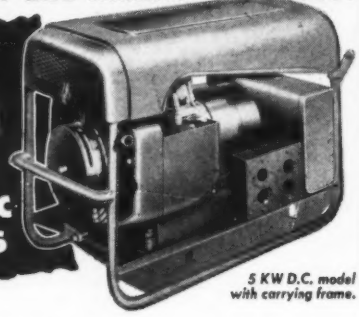
LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

Layne WATER SUPPLY **WELLS & PUMPS**

Cut Costs, Speed Work

on Construction and Maintenance Jobs!

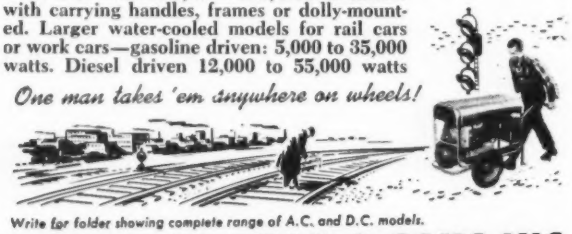
with **ONAN** *Portable* **ELECTRIC PLANTS**



5 KW D.C. model with carrying frame.

Take an Onan portable electric plant to every right-of-way maintenance of construction job! It will supply quick "plug-in" electric power for cost-cutting, fast working electric tools—drills, saws, nut runners, grinders, pipe threaders or any motor-driven equipment. Lightweight models from 400 to 3,000 watts A.C.—750 to 5,000 watts, D.C. Available with carrying handles, frames or dolly-mounted. Larger water-cooled models for rail cars or work cars—gasoline driven: 5,000 to 35,000 watts. Diesel driven 12,000 to 55,000 watts

One man takes 'em anywhere on wheels!



Write for folder showing complete range of A.C. and D.C. models.

D. W. ONAN & SONS INC.
4582 University Ave. • Minneapolis 14, Minn.

U.S. Patent No. 2,503,248

Photos show two difficult applications of Addex Roof-Shield.

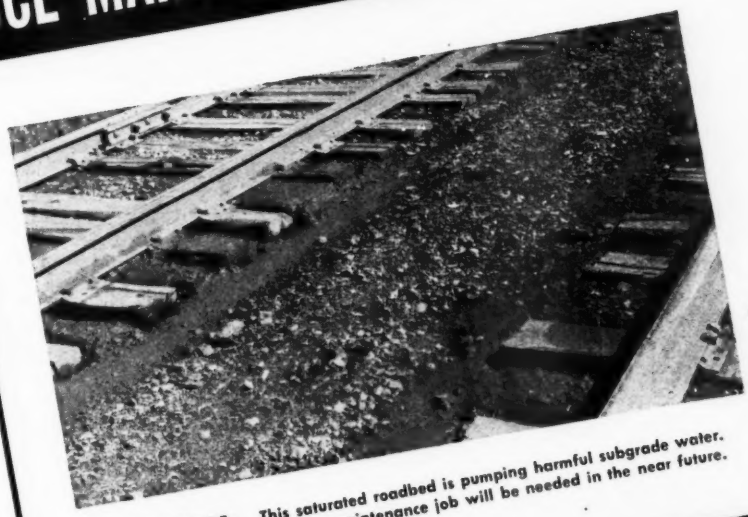
A *NEW...* MODERN METHOD IN *ROOF MAINTENANCE*

- Addex Roof-Shield consists of Glass-Fiber-Mesh, as a mechanical reinforcement, within a film of patented Liquid Asphalt, much like reinforced steel in concrete.
- Addex Roof-Shield follows contours of roof. Seals old roof flashings and parapet walls.
- Ready to use. Easy to use. Light weight.
- Designed for greater productivity.
- Will not blister, alligator nor delaminate.

Write for descriptive literature and specifications

ADDEX CORPORATION
10318 WILBUR AVE. • CLEVELAND 6, OHIO

REDUCE MAINTENANCE in YARDS and TERMINALS



PROBLEM: This saturated roadbed is pumping harmful subgrade water. A costly maintenance job will be needed in the near future.

SOLUTION: Armco Perforated Pipe will remove harmful underground water in this yard. It is an easy job for the maintenance crew.

Maintenance costs go down, employee relations improve when you eliminate excess water in yards and terminals. You can do this easily with Armco Perforated Pipe—it removes unwanted water from underfoot and underground.

Installation is economical. Armco Perforated Pipe comes in long, 20-foot lengths for fast laying. Yet the sections are light enough in weight to be easily handled by two men. No careful hand fitting is required. Strong, tight connections are made with easily-bolted couplings every 20 feet. And from digging to backfilling, the entire job can be handled by unskilled labor.

Figure on Armco Perforated Pipe to provide an economical solution to your next subdrainage problem. It will probably cost less than you expect for a complete installation. Write for details. Armco Drainage & Metal Products, Inc., 2142 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco Perforated Pipe ARMCO

FOR EFFICIENT AND ECONOMICAL SERVICE

The Q and C Universal Type Guard Rail Clamps shown have given excellent service for 15 years on 7" rails of a heavy traffic line.

One size of the forged steel yoke is suitable for a range of sections, which simplifies and reduces inventory.

Order now for early delivery.

Other Q and C Products:

Derails, Switch Point Guards, One-Piece Manganese Guard Rails, Step Joints, Wheel Stops, Gauge Rods, Car Replacers, Snow Flangers and Plows, Skid Shoes, Anti-Slip Rail Tongs, Flangeway Brackets, Electric Snow Melters, Gauging Tools, Foot and Heel Guards.

Serving Railroads Since 1886.

THE Q AND C CO.

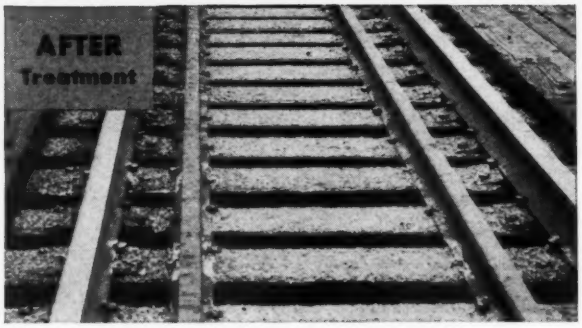
90 West Street
NEW YORK 6

59 East Van Buren Street
CHICAGO 5

611 Olive Street
ST. LOUIS 1

TIE LIFE LENGTHENED with Koppers Tie-Sealing Compound

THESE 14-FOOT BRIDGE TIES are in danger. Unless splits and cracks shown here are retarded, they will get progressively worse. The heart of the ties will be exposed to decay, and tie failure will eventually result. Replacement of these ties would, of course, be expensive.

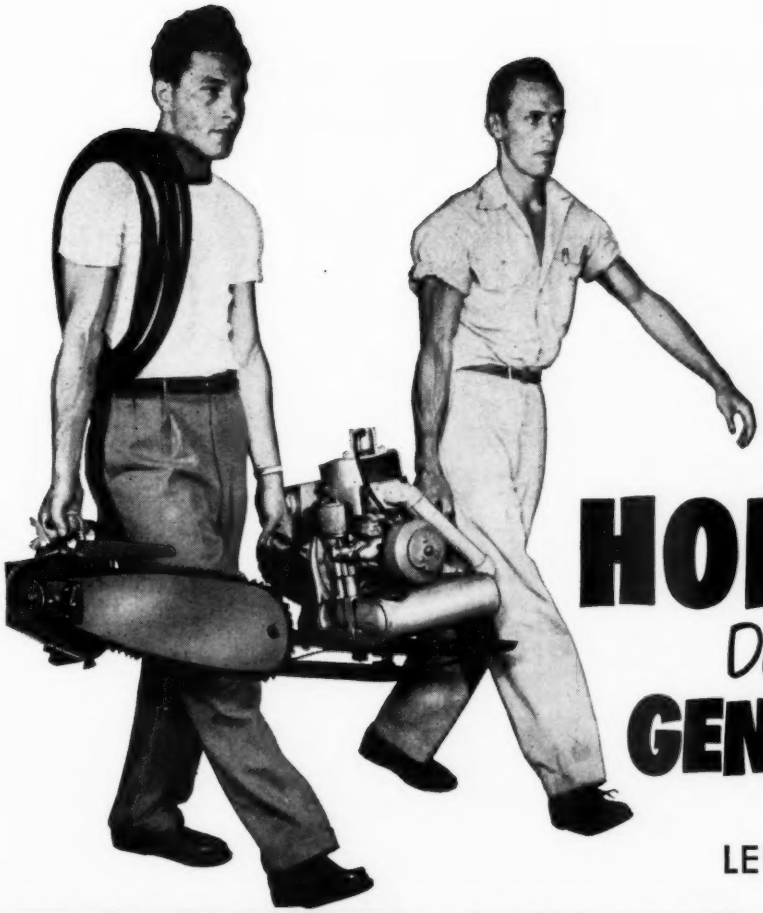


KOPPERS TIE-SEALING COMPOUND, a specially-processed coal-tar coating, was applied by brush. Cracks were filled and sealed with this water-resistant coating. Tie replacement will be deferred an estimated 5 to 10 years. Maintenance is also reduced. The fine stone cover is an armor against fire.

KOPPERS

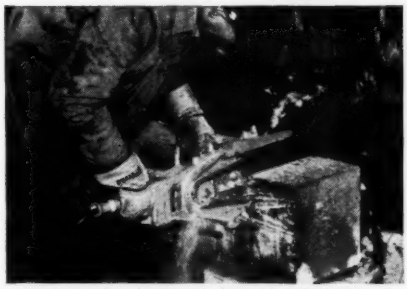
Use Tie-Sealing Compound on your railroad system. Details and price information on request.

KOPPERS COMPANY, INC., Tar Products Division, Pittsburgh 19, Pa.

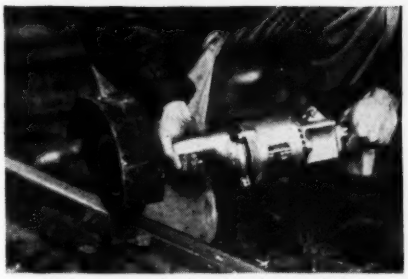


How HOMELITE Dual Purpose GENERATORS

LED THE WAY TO FASTER, LOWER COST MAINTENANCE



For operating high cycle Homelite Chain Saws



For operating high cycle grinders, drills, impact wrenches etc.

It happened this way. High cycle tools . . . faster, lighter, less troublesome tools . . . came along. They represented time and labor savings in maintenance work. But how to get power out on the road was the problem.

Homelite's Dual Purpose Generator provided the answer. With this lightweight carryable gasoline engine driven generator you can operate high cycle tools any place. What's more . . . with the same generator you can operate floodlights and standard 110 volt tools as well as the newer high cycle tools.

Yes indeed, the Homelite Dual Purpose Generators have switched railroad men to faster, labor-saving, high cycle tools. Write today for a free on-the-job demonstration and see what a Homelite Dual Purpose Generator can do for you.

Manufacturers of Homelite
Carryable Pumps • Generators
Blowers • Chain Saws

PERFORMANCE · DEPENDABILITY · SERVICE

HOMELITE CORPORATION

203 RIVERDALE AVENUE • PORT CHESTER, N. Y.

Safety FIRST
Built to LAST
Efficient ALWAYS
RYD-IN *Automatic* COUPLERS

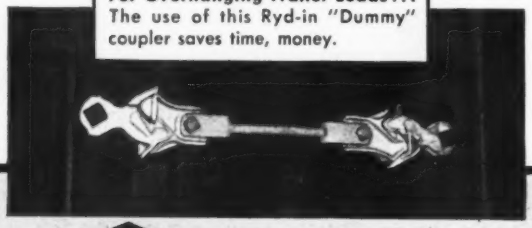
Wt.—steel, 6 lbs.
Aluminum, 2 lbs.

SAFE Ryd-in Couplers engage instantly, positively—*automatically*. No manual guidance required. Should derailment occur, Ryd-in Couplers minimize the hazards by keeping motor cars and trailers in true alignment, close to the track.

SUPER-RUGGED Built to withstand the shock and strain of heavy loads, yet light in weight. No jackknifing.

EFFICIENT Ryd-in Couplers operate dependably, are always on the job—cannot be misplaced. Because all Ryd-in Coupler bodies are identical, any two of like size will engage. No "male and female" construction means there's no need to reverse equipment. Ryd-in Couplers are easy to attach. Complete with nuts and bolts, they fit any motor car and trailer equipped with the A.R.E.A. standard drawbar.

For Overhanging Trailer Loads... The use of this Ryd-in "Dummy" coupler saves time, money.

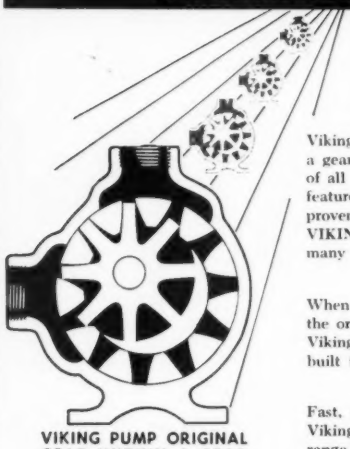


RYD-IN

Let Rydin make a test installation on your equipment. Write us for details.

RYDIN RAILWAY EQUIPMENT CO.
Railway Exchange Building, Chicago 4, Illinois

WHERE VIKING PUMPS LEAD ... OTHERS FOLLOW!



VIKING PUMP ORIGINAL GEAR-WITHIN-A-GEAR PRINCIPLE

Viking—the original "gear within a gear" pump is the most copied of all rotary pumps. Feature after feature, improvement after improvement FIRST appearing in VIKING pumps is copied by many manufacturers.

When you need pumps, specify the original "gear within a gear" Viking to be sure the pump is built for your job.

Fast, positive self-priming of all Viking pumps in the complete range of sizes, ½ to 1050 gpm, assures you of dependable pumping of either light or heavy liquids in the size and style needed.

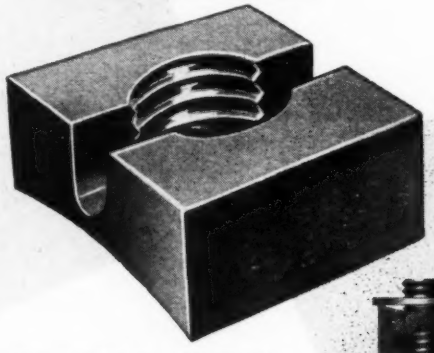
Ask for descriptive bulletin 52SY today.

VIKING
AN HONORED NAME IN PUMPING

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

Lewis LOKTITE NUTS



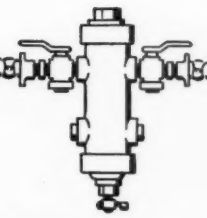
Side view, reduced, showing areas of friction lock.

Specify Lewis Loktite Speed Holding Nut #2 for positive lock . . . no other nut required. Equals tensil strength of bolt. Trimmed sides provide a close wrench fit. *For Double-Life, fewer replacements, specify Hot-Dip Galvanized finish!*

See your Lewis representative, or contact factory for further details.

Lewis **BOLT & NUT COMPANY**
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY



All Air Lines Lead to Savings

WHEN YOU USE

GARDNER-DENVER

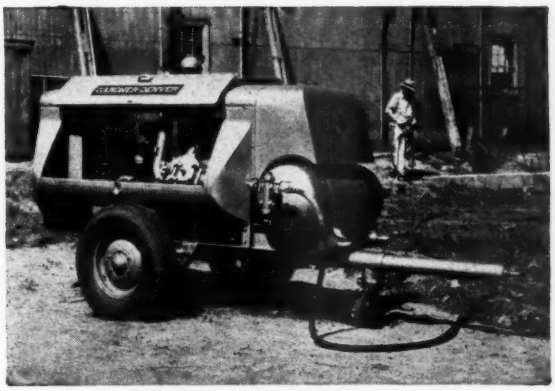
PORTABLES AND AIR TOOLS

To Speed Your Work

Fast Drilling— with Gardner-Denver Sinkers. Outstanding drillers in every weight class. Exceptional hole cleaning ability.

Economical Breaking — with Gardner - Denver Paving Breakers. A size for every type of work. Safety latch. Built-in lubricator.

Solid Tamping—with Gardner-Denver Backfill Tampers. Smooth walking. Non-freezing exhaust. Easy to maintain.



Full Air Capacity — at any altitude — with the Gardner-Denver Two-Stage WH-105 Gasoline Powered Portable. Fully water-cooled cylinders for dependable operation, regardless of weather or temperature extremes.

Write today for full information on Gardner-Denver Water-Cooled Portables and Gardner-Denver Air Tools.

Powerful Driving— with Gardner-Denver Sheeting Drivers. Adjustable jaws. Safety latch. Removable foot rests.

Dependable Pumping — with the VP4 Pneumatic Sump Pump. Top-suction prevents clogging —protects motor and bearings from mud.

Easy Digging— with Gardner-Denver Clay Diggers. Made of special steel for extra strength. Quickly converted to Trench Digger.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

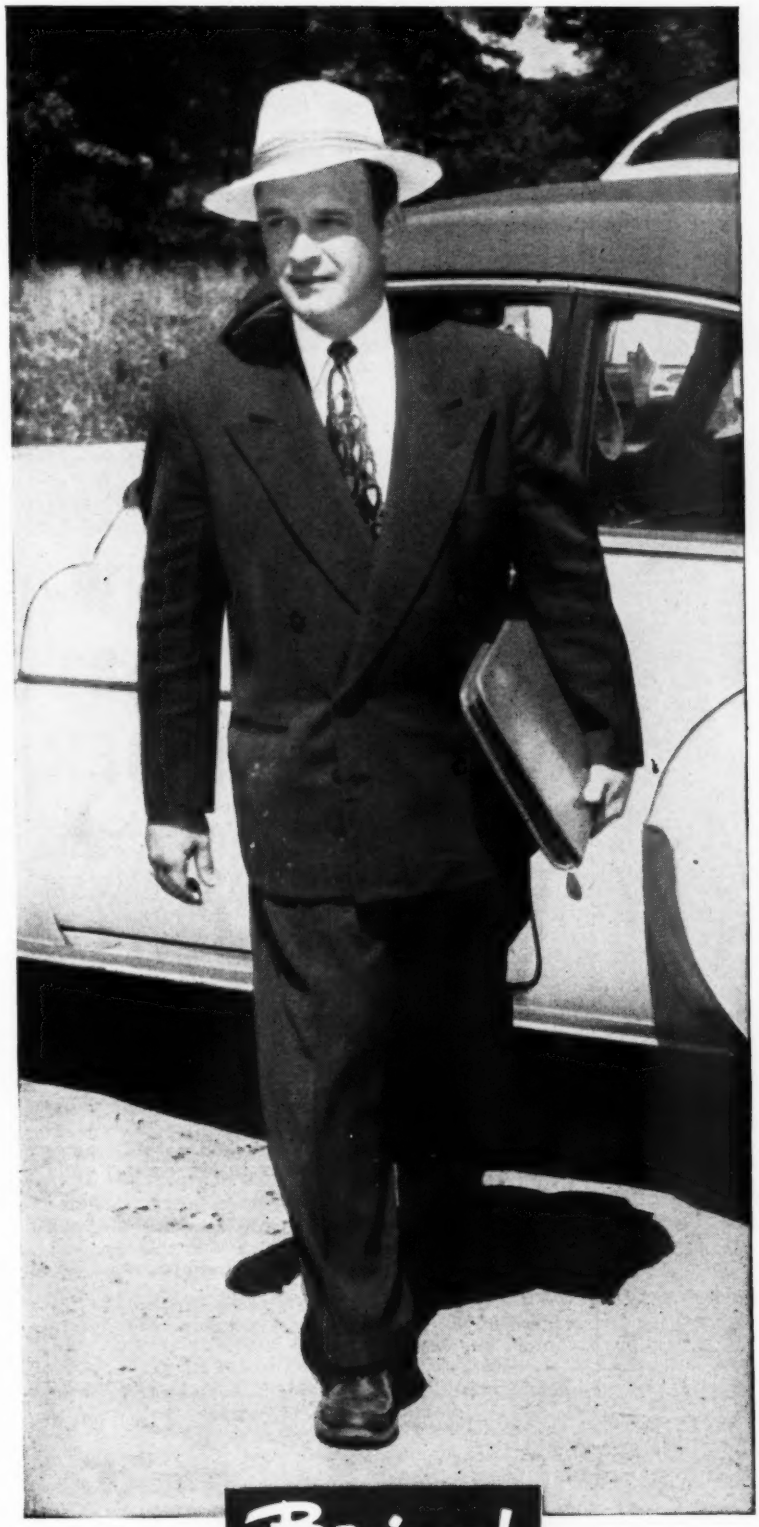
H U B B A R D

H U B B A R D

TRACK TOOLS

SPRING WASHERS

UNIT RAIL ANCHORS



He can help you cut tie handling costs

WITH Brainard's new method of handling and distributing ties, using specially rolled steel strapping and special lifts*, you can cut labor costs for tie handling *as much as 30%*.

How? That's where Brainard staff engineer Jack Boyer comes in. He is ready to study your tie handling operations . . . explain the Brainard system . . . and turn over to you plans for the special lift* (free of charge to railroads and treating plants for production in their own shops).

Jack, who helped develop and prove this system, can show you how just two men can handle unit loads of ties, which are prepared with two special slack bands of steel strapping at the tie-treating plant. When the unit loads are suspended by the lift, one man on a catwalk pulls ties one at a time, dropping them parallel to the track.

Call on your Brainard Strapping System representative now—and start saving man-hours.

*Patents pending

COMPLETE STEEL STRAPPING SYSTEM, ENGINEERING, STEEL STRAPPING, TOOLS AND ACCESSORIES, ANTI-CHECKING IRONS

Brainard

SHAROMSTEEL

STEEL DIVISION

SHARON STEEL CORPORATION

WARREN, OHIO

For complete information, write Brainard Steel Division, Dept. S-3, Griswold St., Warren, Ohio.

If you are interested in

BALLAST CLEANING

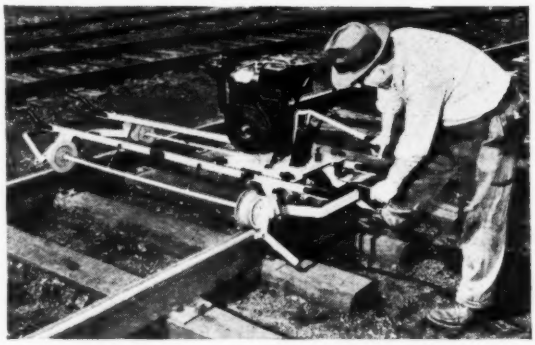
we stand on our record

Just Ask the Railroads That have used us!

FRANK SPENO RAILROAD BALLAST CLEANING CO. INC.

306 North Cayuga Street Ithaca, New York

SIMPLIFY TRACK MAINTENANCE



. . . with the RTW P-11-S PORTABLE CROSS GRINDER

Meet today's more urgent demands for fast, economical track maintenance by using this improved, light-weight, portable, and easy-to-operate Rail Joint Cross Grinder and Slotter—the Model P-11-S. You will find the P-11-S a real time-saver for removing overflow metal at rail ends as well as cross grinding behind welding crews. Here are some of the reasons.

*** Grinding wheel spindle and gasoline engine pivot 360°—you work both the rails with only one grinding head.

*** Light weight permits quick and easy track clearance.

*** Pivoted foot clamping device with automatic release holds grinder firmly against rails during slotting.

*** Engine and grinding equipment are mounted on transverse carriage which operates on ball bearing rollers running on steel guides.

*** Hinged and coil-spring-mounted handle for feeding 8" grinding wheel permits easy operation, any depth of cut.

Write today for free bulletin on the P-11-S Portable Cross Grinder.

Railway Track-work Co.

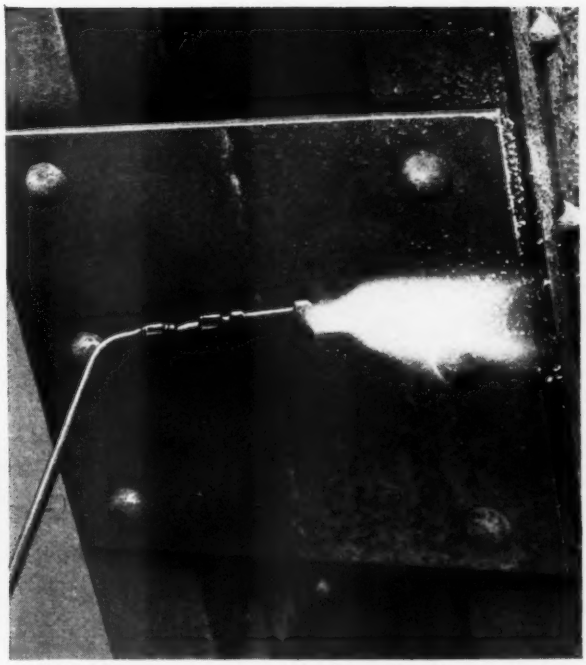
3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

Distributors for

Burro Cranes
Dapco Sprayers
LeRoi Air Compressors
McCulloch Chain Saws
THOR Electric Tools
Wayer Impactors

57 87

WATER TOWER STRUCTURE . . . Here, an operator, working from a bos'ns chair, flame cleans the tower structure prior to painting. Airco equipment —torches, tips, regulators and gases were used for the entire operation.



BATTEN PLATE . . . on a railroad bridge being flame cleaned with Airco torch. Notice how smooth and clean one half of the plate is . . . how old paint and rust flakes have been completely removed.

flame cleaning

CARS . . . BRIDGES . . . STEEL STRUCTURES CUTS PAINTING PREPARATION COSTS AS MUCH AS 50%

For speed and effectiveness, no other method of preparing steel surfaces for painting comes close to the flame cleaning process. Cost studies made by several leading railroads show that, compared to laborious hand scraping and chipping, cleaning costs are cut by as much as *one-half!*

This Airco process is also used to condition new steel before applying prime coats. Mill scale is loosened and corrosion-starting dirt and moisture eliminated. Surfaces thus prepared reduce costs of future maintenance.

Airco's wide variety of special multi-flame tips make it possible to clean surfaces of practically every contour and size. Learn how you can save with fast, economical oxy-acetylene flame cleaning — get in touch with your local Airco office today.

BEAM FLANGE of a pit-installed track scale is Airco flame-cleaned prior to painting. Using an Airco Style No. 120 Tip, this oxyacetylene process is equally adaptable for cleaning water towers . . . signalling equipment . . . in fact, any type of steel railway structure.

Costs come down under the Airco plan

AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

For additional information, use postcard, pages 211-212

You can handle MORE jobs on a LOWER equipment in

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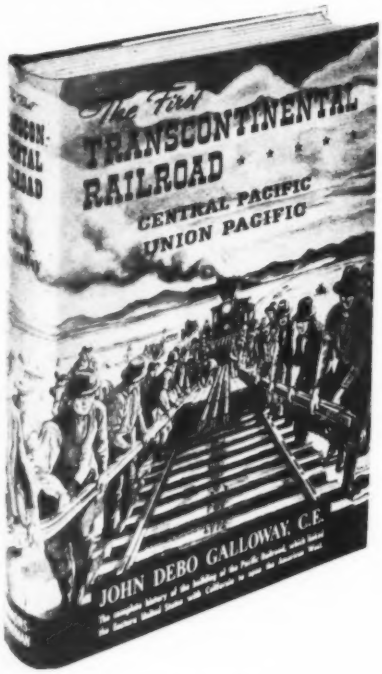

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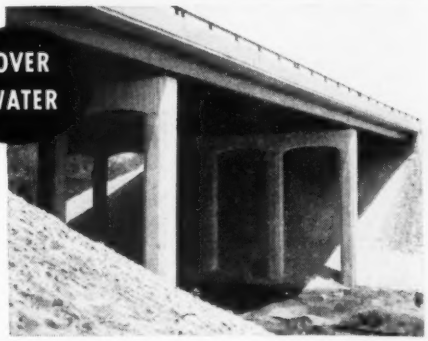

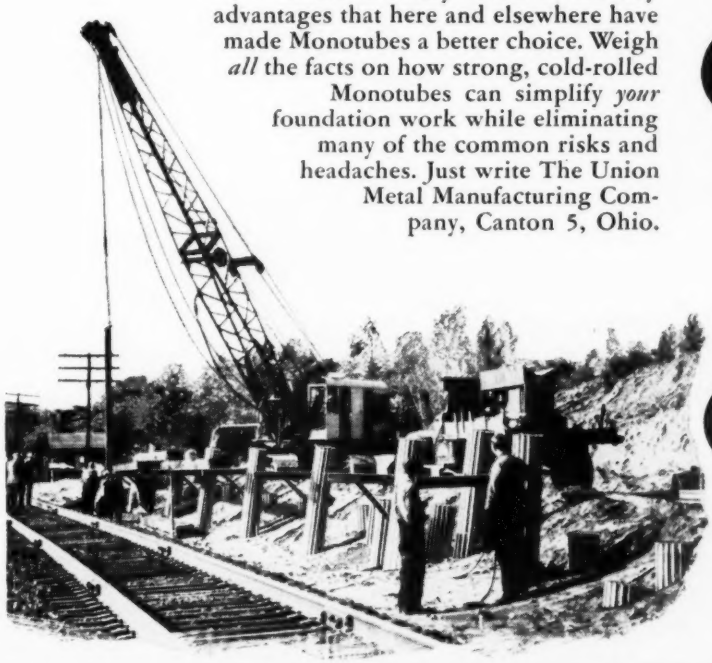

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Railway Engineering and Maintenance

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Subject: A Look Backward—and Forward

March 1, 1952

Dear Readers:

Sometimes comparisons of the present with some particular time in the past can be enlightening and constructive as well as interesting. At the risk of provoking nostalgic thoughts in the minds of some of our older readers I would like to hark back this month to the first issue of Maintenance that was devoted to the subject of labor economies. This was the March, 1922, issue, and it was called the "Labor-Saving Number."

At that time the editorial policies of this magazine were under the able direction of the late Elmer T. Howson whose many endowments included the ability to predict future trends with uncanny accuracy. In 1922 the mechanization of maintenance-of-way work was like an infant learning to walk. This is shown by the fact that the only power-driven machines mentioned in the advertising pages of that first "Labor-Saving Number" were motor cars, pneumatic tie tampers, ditchers, spreaders, a power rail layer and a power ballast screen. But Mr. Howson, perceiving the great need for more and better machines, began the practice of devoting the March issue each year to the subject of equipment economies. For evidence that his faith in the future of mechanization was completely justified one need only to note the wealth of equipment and devices mentioned in the advertising and editorial pages of this issue—30 years later.

It is interesting to speculate on the effect that this constant hammering on the subject might have had on the progress of mechanization. The evidence in this direction is largely circumstantial. We know that when the first "Labor-Saving Number" was published the types of M/W power equipment in existence could almost be counted on the fingers of one hand. We know that in that issue the need was mentioned for various machines, including equipment for skeletonizing track, power saws for cutting off piling, weed-mowing machines, track-lining devices, tie-renewal machines, bonding drills and others. We know that, sooner or later, all of these machines, and many more, were introduced and are proving their worth today, not just here and there, but on all railroads throughout the country.

Mr. Howson and the staff that worked with him three decades ago envisioned the large future of mechanization and applied themselves diligently and conscientiously to the task of making that future come true. None can say for certain what additional progress will be made during the next 30 years. However, insofar as it is humanly possible to do so, that progress will be registered in the pages of this magazine.

Yours sincerely,

Merwin H. Dick

Editor

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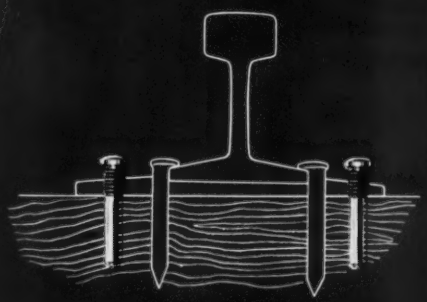

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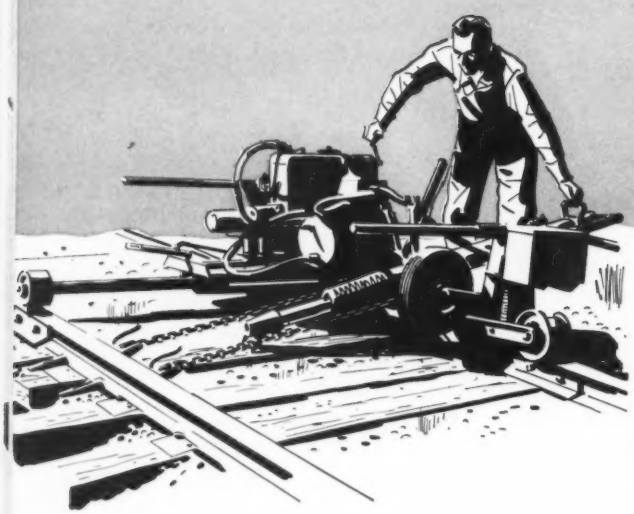

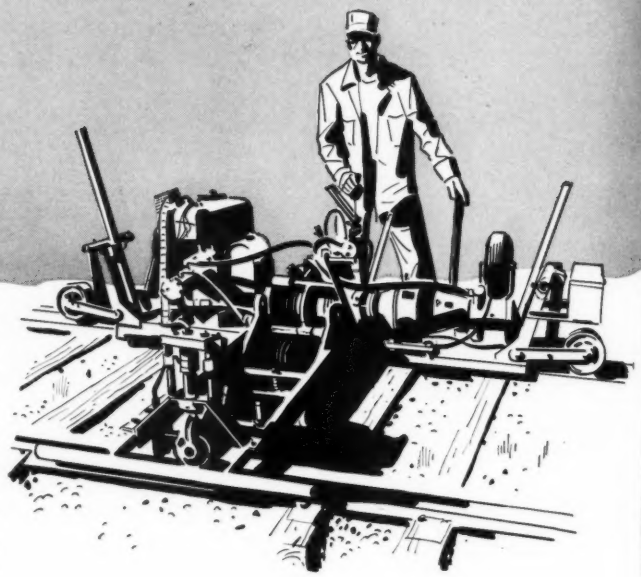

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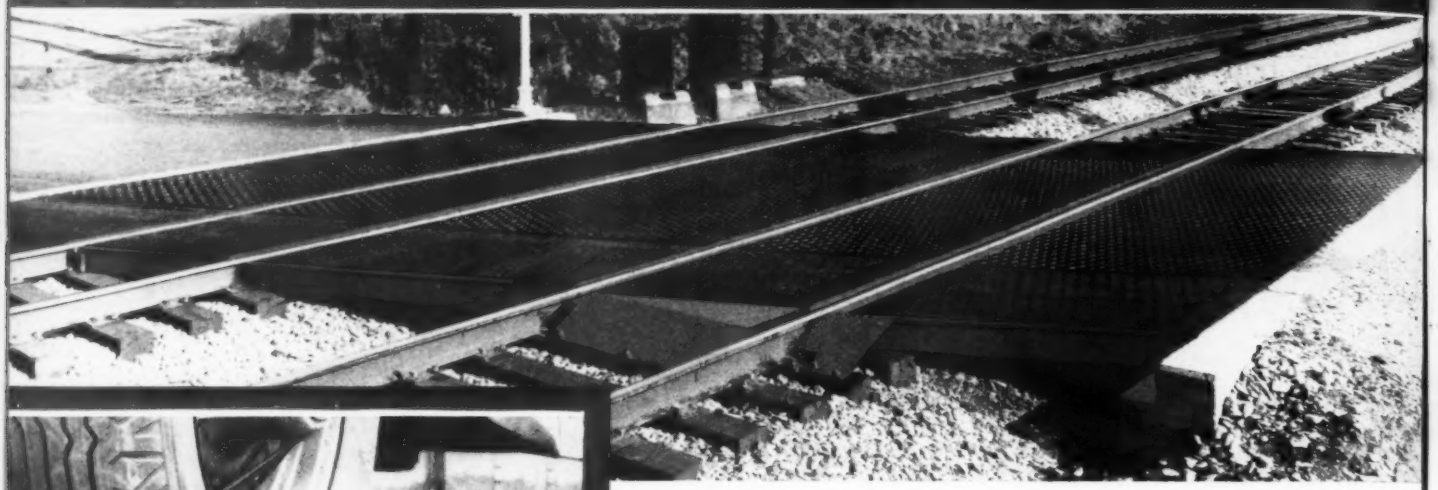

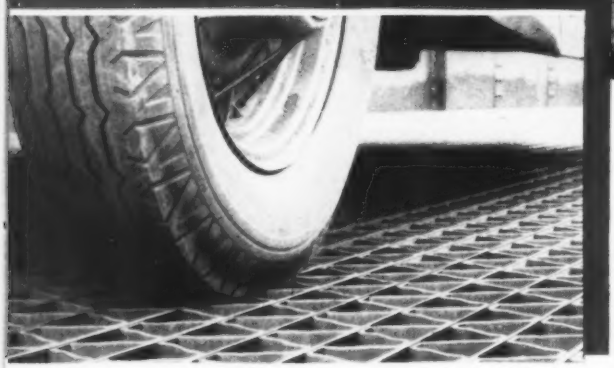

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Human Relations —

Must Be Good If Machines Are to Work

It would be easy to acquire the impression that mechanization is the foundation of railroad maintenance-of-way work today. Unquestionably the machine has been one of the most important factors in helping to keep costs under control in the face of inflated wages and prices. It is because of this importance, and the still unrealized potential inherent in mechanization, that this magazine continues to devote its March issue each year to the subject of equipment economies.

But is there a possibility that widespread preoccupation with machines has caused other important factors, such, for instance, as human relations, to be minimized or overlooked entirely. The field of human relations is mentioned because throughout all industry there is unquestionably a growing consciousness—amounting to something of a ground swell—that ways must be found to make it possible for persons and groups of persons to work together more effectively if our economy is to function at its best. This applies whether we are thinking of the relationship between a foreman and the individual men in his gang or between captains of industry and the organizations representing their employees.

That the thinking of at least some railroad engineering officers is trending in this direction is indicated by remarks made by J. B. Akers, chief engineer, Southern System, in a recent address. Mr. Akers referred to a statement in a book to the effect that "while material efficiency has been increasing for 200 years, the human capacity for working together has in the same period continually diminished." The same source, according to Mr. Akers, goes on to say that, "while we have been focusing our attention on the mechanical and technical aspects of industry, we have all but forgotten that industry is carried on by men and women, and that a business organization is a system of cooperative effort." These quotations are from a book by Burleigh B. Gardner and David G. Moore.

In other words, what is being said here, to bring the subject close to home, is that mechanization of maintenance-of-way work, if its full potentialities are to be realized, must occur in an atmosphere of sound relations between the men who operate the machines on the one hand and their supervisors on the other.

The difficulty is that "human relations" is not only a high-sounding term but it is also highly general. It's easy enough to discuss it in such terms but there is little practical value in doing so unless we can be specific about what it means and how it is to be applied in a work-a-day world. Anybody who has the knack of getting along with people, including those over whom he has supervision, and of winning their cooperation and loyalty, is practicing good human relations whether he realizes it or not. Contrariwise, those whose relations with others are frequently of a conflictual nature, involving friction and resulting in ill feelings, need to put their houses in order.

The effects of a campaign to improve employee relations, if started at the top, will quickly filter down through the ranks and make themselves felt in the form of greater efficiency and productiveness, even in situations where primary dependence for doing the work is placed on machines.

EXTRA GANGS—

Can Labor Turnover Be Reduced?

WITH maintenance programs largely laid out for the coming season, what are the chances of obtaining and keeping a full complement of experienced track laborers to man the extra gangs? Where labor of the so-called itinerant type is used for this purpose it is known from past experience that the chances are not too good. A check made at two railway labor-recruiting agencies revealed that it is necessary each month to ship out an average of 150 per cent of the number of men worked in these gangs. In other words, to maintain at full strength a gang organized for 60 men it is necessary to ship 90 men *each month* to the working location. With colored laborers, the turnover is 125 per cent, or 62 men shipped each month for a 50-man gang.

If these averages are indicative of labor turnover in extra gangs as a whole, then we might well ponder on the effects and cure of this condition. For one thing, the gang is organized for the number of men considered necessary to develop the best efficiency of the machines furnished for the job at hand. When the number of men drops below the designated quota, the men must be redistributed to fill gaps in the gang, and the machines must be slowed down accordingly. As one means of helping to cope with this problem it is not uncommon for the foreman to request that a small surplus of men be provided so that redistribution can readily be made within the gang when absenteeism or loss of men require it. This practice adds to the cost of the work.

It must be kept in mind, too, that every new man employed must be instructed in his work and watched to see that he works safely. This calls for close supervision which, while small for one individual, becomes an important factor when new men are constantly coming into the gang. Hence, more foremen and assistant foremen are required than would be necessary if the turnover were low.

We might ask why the turnover is so high. The general opinion is that many extra-gang laborers are men whose primary interest is to get a stake with which they can go off somewhere and indulge themselves in alcohol. Be this as it may, there are two or three other factors that also seem to have a bearing in determining the length of employment of such extra-gang workers.

The most important of these is the competence of the general foreman of the gang. If he is a "good" foreman—that is, competent in his knowledge of the best methods for carrying out the work, alert for any injustices that may be imposed on the men by others, and yet firm in his demand for a fair day's work—the men will generally stay longer. Other ways of keeping turnover down are to provide an abundance of wholesome food, and to furnish adequate, sanitary housing.

While it is also necessary to provide well-maintained machines and good tools, and to keep the work moving forward at a steady rate, all of which have their effect on morale, the three forementioned factors are the main inducements for steady employment. Indications are that labor shortages will arise in various parts of the country during the 1952 working season. Because of this possibility it would seem prudent to review the present policies that have a bearing on labor turnover in extra gangs, with the objective of taking any corrective measures that may be found necessary. Now is the time to do it.

EQUIPMENT ECONOMIES—

Now Helping Small Railroads Too

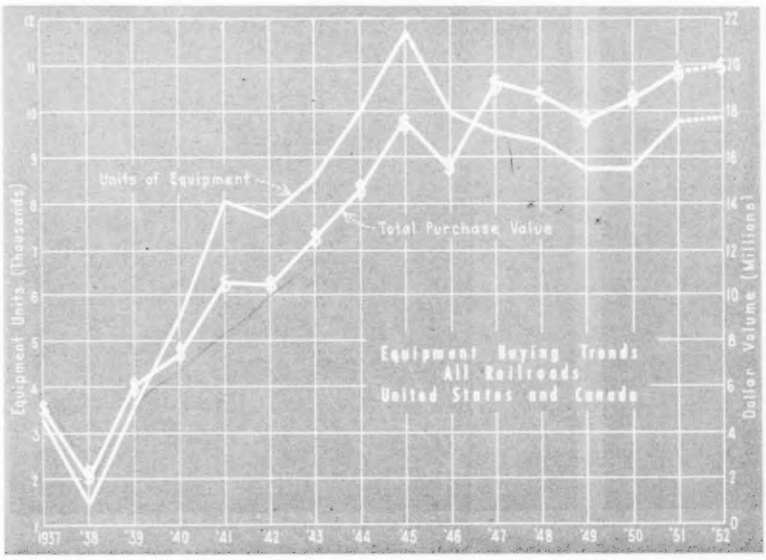
FOR many years the savings being obtained by large railroads through the intensive use of M/W work equipment and roadway machines were largely denied to the smaller railroads—but not any more. This denial was largely attributable to the fact that the small road, with commensurately diminutive maintenance programs in comparison with those of its larger neighbors, could not provide enough work to keep many power tools busy. Knowing full well, therefore, that interest, depreciation and other fixed charges had to be allocated to the amount of actual use, however small it might be, many of these roads could not show enough savings to justify the purchase of machines.

However, wage rates, rising faster than the cost of machines, have changed the situation until the purchase of M/W work equipment is not only economically justifiable by small railways, but is mandatory if they are to maintain their properties to a standard capable of continuing to handle present volumes of traffic. Elsewhere in this issue a number of charts have been reproduced to "Show Savings with Power Track Machines." Nothing more than a quick glance at these charts, each for a different machine, is needed to see how easily any railroad, large or small, can justify the purchase of power tools at present wage rates and equipment costs.

How well the maintenance officers of small railroads have kept abreast of these developments can be gathered from the volume of work equipment and power tools they reported as purchasing in 1951. Out of a total of 176 roads that purchased equipment last year, about 45 per cent consisted of railroads smaller than Class I. These small roads, although buying in small quantities, purchased more than 10 per cent of the total equipment bought during the year. Those that did not buy new machines rented such machines as they could.

Yes—equipment economies are beginning to mean as much to the small railroads as to the large. Likewise, as a growing market for the suppliers, these roads will be competing more and more for a share of the available machines. With the taste of effective, economical results not to be forgotten, they will no longer be denied. Beware, you giants of the industry—you may have 10 units of equipment on order but there may be 15 small fry having ordered a unit apiece.

Purchases of M/W Machines . . .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All Railroads
United States and Canada
Equipment Units (Thousands)
Dollar Volume (Millions)
'37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52

. . . Going Still Higher in 1952

Railways plan to spend $19,800,000 for 9,800 machines and power tools to help lay 2,011,000 net tons of rail, install 43,000,000 ties, and raise approximately 26,000 miles of track

• It may well be that the equipment exhibit sponsored by the National Railway Appliances Association in Chicago's Coliseum, March 10-13, will provide for railway officers the final incentive that will assure that record volumes of work equipment and roadway machines will be purchased in 1952. In the financial statements of their last year's business efforts, which reflect in most cases a relatively low net income from high traffic volume, railway officers also have a new and powerful incentive to buy cost-reducing equipment. This factor, added to others, such as possible labor shortages and the five-day week, has already prompted many roads to plan to buy more equipment in 1952 to maintain their properties than they did last year or for several years. Other roads, faced with the same needs, are "holding back"—waiting, perhaps, to see if the N.R.A.A. exhibit might not show them better and more economical ways of maintaining their tracks and structures.

These deductions are reflected in the replies received from the chief maintenance officers of a group of representative roads, who were questioned by *Railway Engineering and Maintenance* as to how much M/W work equipment and tools they expect to buy this year. Answers were received from 40 officers, many of whom gave details of their anticipated purchases: Sixteen of these officers reported that they plan to purchase more equipment in 1952 than their plans called for at this time last year. With even more optimism, seven other men have already planned to buy more machines this year than they actually purchased in 1951. On the other hand, eight officers stated that their planned purchases are smaller than they were last spring.

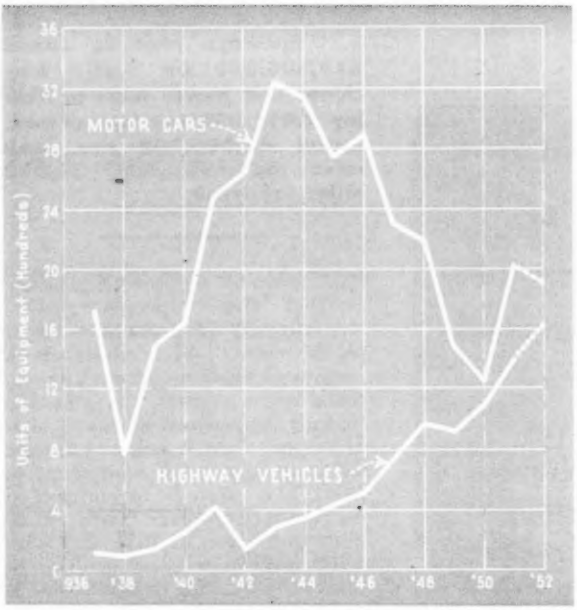
However, five officers—awaiting developments – did not commit themselves as to what their purchases might be. The decisions of these men will undoubtedly determine whether or not a new record will be established. The N.R.A.A. may be just as much of a good influence on these men as on the single chief engineer who, having purchased equipment in large volumes in each of the last several years, said he will buy no new equipment this year. Altogether, of the 40 officers replying to the inquiry, 33, representing 157,956 miles of lines, reported that they planned to purchase at least 3,023 units of equipment in 1952.

From these specific replies, strengthened by deductions based on the number of machines—both large and small—purchased by the roads in recent years, it is estimated that all the railways of the United States and Canada will buy at least 9,800 units of work equipment in 1952. This estimate of anticipated purchases compares with 9,700 units purchased in 1951, and with 8,700 units purchased in each of the two preceding years. There is a distinct possibility that the volume of purchases in 1952 may even reach 10,000 units.

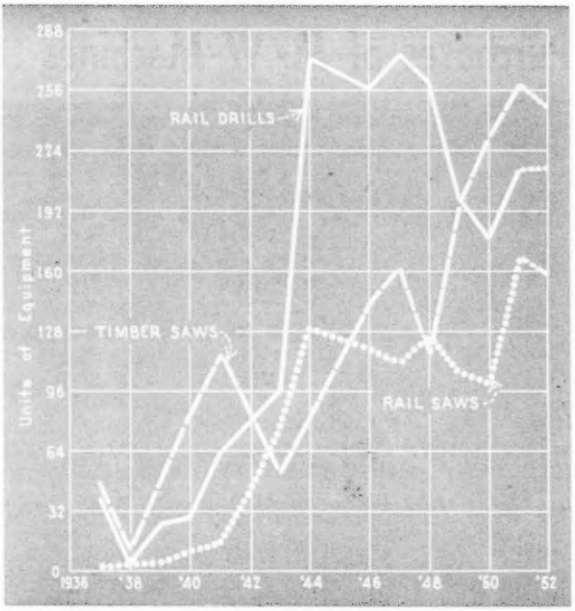
On the basis of money reported by the railways for their 1951 purchases, it is estimated that the 9,800 units to be bought in 1952 will cost about $19,800,000—a new high in money spent for M/W equipment. These figures are substantiated by the reports of 79 roads, made near the end of 1951, as to the amount of money they plan to spend for roadway machines in 1952. Of these roads, 46 expected to spend more money for this purpose than in 1951, while several reported that they would spend less. Specifically, the planned purchases of these 79 roads as a group amount to $7,397,607—a total of $123,170 more than they spent in 1951.

Labor Uncertainty Is Factor

The uncertainty that exists as to whether enough labor will be available during the current year to complete the ambitious maintenance programs that are needed and have been planned, is undoubtedly one of the major factors in pointing to increased equipment purchases in 1952. Chief engineers replying to the questionnaire on current maintenance programs have indicated that they expect the availability of labor to be about the same as it was in 1951, with shortages becoming acute in industrial areas where manufacturing activities geared to the defense effort are continuing at a high level. Of the 32 officers to report on this problem, 15 expected some trouble in securing enough labor to carry out their work; a like number an-



Transport equipment, as usual, continues to be in heavy demand



Buying of basic small machines fluctuates but trends upward

ticipated no trouble in filling their labor allotments; while two doubted that any labor scarcities were developing. Only one chief engineer expected severe shortages.

However, with a good supply of labor far from being assured, most of the chief engineers said they planned to continue intensive use of existing work equipment, the replacement of obsolete machines, and the purchase of new types of power tools whenever available. This view was aptly expressed by one chief engineer who said: "To meet this situation it is our plan, as in the past, to use machines and equipment to the greatest possible extent, and additional equipment is being purchased with that end in view." Another maintenance officer wrote: "It is probable that we will have some difficulty in securing a sufficient amount of work equipment to carry out our program . . . we have no plans for overcoming any labor shortage that may develop other than to continue using labor-saving equipment."

The officer who was definite in his belief that the labor condition will grow worse stated: "All efforts are being made to increase the efficiency of our maintenance-of-way forces by studying and putting into effect reorganization programs dealing with new methods of performing work, by transporting men in trucks on the highways and by the extensive use of other labor-saving equipment."

Almost all of the officers who anticipate any scarcity of labor in the coming year plan to overcome it to some extent by establishing labor camps. To fill these camps they expect to recruit men from labor contractors, through the Railroad Retirement Board, or possibly to get them from other sections of their line where a surplus exists.

On the basis of reports received by this magazine from representative engineering officers, it is estimated that the maintenance programs of all the roads in Canada and the United States contemplate the laying of about 2,011,000 net tons of rail, the installation of 39,943,000 crossties, the application of 35,000,000 net tons of ballast and the out-of-face surfacing of 26,300 miles of track. This program exceeds the work accomplished in 1951 by at least 230,000 net tons of rail laid; 3,500,000 crossties installed; and 1,300 miles of track raised. However, the amount of ballast used is expected to be at least 352,200 net tons less than was used in 1951. To accomplish such an ambitious program it is very apparent that M/W work equipment and roadway machines—both the old and the new—will receive intensive use during the year.

While the roadway forces will be keeping their machines busy during the year, the bridge and building men will definitely not be allowing theirs to remain idle. According to 27 chief engineers, more work on both bridges and buildings is planned during 1952 than was accomplished last year. Altogether these men expect to spend $33,815,822 on bridge maintenance in 1952. This represents a net increase of $1,605,062 for these roads as compared with 1951. This net increase results from a gross increase of $2,851,000 on 21 roads offset by an aggregate decrease of $1,245,938 on six roads. The amount of money allocated by 28 roads for the maintenance of buildings during the year totals $35,665,214. This is $497,897 more than these roads spent in 1951. A total of 13 of these roads reported that they would spend $1,123,897 more than they did in 1951, while four roads indicated that they would spend $626,000 less than they did last year. Nine roads expected to spend about the same as last year and one indicated it would spend more but did not give the amount.

With such large programs scheduled for both the track and the B & B departments, and with a high volume of traffic producing a relatively low net income, it is self evident that the chief engineers of the railroads of the country will be doing all in their power to keep their unit costs at a minimum. They know from past experience that the intensive use of work equipment is one of the best ways of doing this. Consequently, they cannot afford to employ obsolete machines or inefficient tools, but instead will order new equipment. Record purchases are expected to result.

T. A. Blair
President, A.R.E.A.

Fifty-first Annual

A.R.E.A. Convention

Palmer House, Chicago

• For the convenience of those who plan to attend the A.R.E.A. convention, the complete program is presented below. It should be noted that some deviation has been made from the order of presentation followed in the past. The "structures" committees, which heretofore reported on the last day of the convention, will this year present their reports on the morning of the second day, and the Committees on Ties, Track, and Rail, which in recent years have met on the afternoon of the second day, will this year report on the morning of the last day. As in the past, however, reports of committees on related subjects have been grouped together in order that members can attend all those presentations most closely allied to their interests.

TUESDAY, MARCH 11

Opening Session—9:45 to 12:15
Grand Ballroom

Address by T. A. Blair, President
Report of N. D. Howard, Secretary
Report of J. D. Moffat, Treasurer
Greetings from the Signal Section, A.A.R., E. S. Taylor, Chairman
Greetings from the Electrical Section, A.A.R., H. C. Paige, Chairman
Address by J. H. Aydelott, vice-president, Operations and Maintenance Department, A.A.R., on "The Impossible in Transportation—Can the Railroads Stage a Repeat Performance?"
Address by G. M. Magee, research engineer, Engineering Division, A.A.R., on "A Review of Research Developments in 1951"
Reports of Committees on Yards and Terminals
Economics of Railway Location and Operation
Address by W. T. Rice, general superintendent, Richmond, Fredericksburg & Potomac, on "Factors Affecting the Economies of Railway Operation"

Afternoon Session—2:00 to 4:45
Grand Ballroom

Reports of Committees on
Highways
Address by W. J. Hedley, assistant chief engineer, Wabash, on "Second Report on the Achievement of Grade Crossing Protection"
Cooperative Relations with Universities
Address by O. W. Eshbach, dean, Northwestern Technological Institute, on "Implications of the Manpower Situation"
Contract Forms
Records and Accounts
Water Service and Sanitation

WEDNESDAY, MARCH 12

Morning Session—9:00 to 12:00
Red Lacquer Room

Reports of Committees on
Wood Bridges and Trestles
Address by Alan D. Freas, engineer, Forest Products Laboratory, on "Laminated Wood: Possibilities for Railroad Use"
Clearances
Waterproofing
Address by J. B. Blackburn, research engineer, Purdue University, on "Tests on Waterproofing Coatings for Concrete Surfaces"
Impact and Bridge Stresses
Masonry
Address by George H. Paris, railroad representative, Structural Bureau, Portland Cement Association, on "Concrete Durability—at a Price"
Address by Dr. R. B. Peck, research professor of soil mechanics, University of Illinois, on "The Bearing Capacity of Clays"
Iron and Steel Structures
Address by Dr. Joseph Bigos, director of research, Steel Structures Painting Council, on "Investigations under Way and Proposed by the Steel Structures Painting Council"

Association Luncheon—12 Noon
Grand Ballroom

Announcement of the results of election of officers
Address by Fred G. Gurley, president, Atchison, Topeka & Santa Fe

Afternoon Session—2:30 to 5:15
Red Lacquer Room

Reports of Committees on
Wood Preservation
Buildings
Maintenance of Way Work Equipment
Economics of Railway Labor
Address by G. M. O'Rourke, assistant engineer maintenance of way, Illinois Central
Roadway and Ballast

THURSDAY, MARCH 13

Final Session—9:00 to 12:30
Grand Ballroom

Reports of Committees on
Continuous Welded Rail
Ties
Address by G. M. Magee, research engineer, Engineering Division, A.A.R., on "Progress in the A.A.R.-N.L.M.A. Crosstie Research Project"
Track
Address by C. J. Code, engineer of tests—maintenance of way, Pennsylvania, on "Maintenance of Way Tests"
Rail
Address by C. J. Code, engineer of tests—maintenance of way, Pennsylvania, on "Supersonic Inspection for Rail Web Defects"
Address by G. M. Magee, research engineer, Engineering Division, A.A.R., on "Stress Measurements in 115 RE and 132 RE Rail on Curved Track"
Address by R. E. Cramer, special research associate professor, University of Illinois, on "Shelly Rail Studies at the University of Illinois"
Address by R. S. Jensen, research assistant professor of engineering materials, University of Illinois, on "Joint Bar Research"
Closing Business
Installation of Officers

Show Ingenuity in Developing

Many of the machines now in common use in maintenance-of-way work were originally conceived in the minds of railroad men. That such men are far from convinced that opportunities for further mechanization are exhausted is indicated by continuing activity on their part in developing new mechanical aids of one kind or another, or in devising new adaptations of existing equipment. The fact is that in the last couple of years there seems, if anything, to have been an acceleration of activity in this direction. As evidence of this activity descriptions of some of the more recent developments of railroad men throughout the country are presented on these and the following pages. It must be emphasized, however, that this is by no means intended to be a complete roundup; doubtless there are many other machines or devices of recent development by maintenance men, which are proving their worth in actual service today. One further point needs to be made here, namely, that a number of the machines described in these pages have been further perfected by manufacturers and have been, or soon will be, made available to the railroads as a whole. That's one of the undeniable attributes of our system of private enterprise; the man who sees the need for a device and has the drive and mechanical ingenuity necessary to convert the idea into reality not only makes a contribution to the economy but also is likely to realize tangible rewards himself.—Editor.

Three Nickel Plate Men Devise Track-Gaging Machine

• Three engineering officers of the Nickel Plate have developed a track-gaging machine which is designed to increase the accuracy of the gaging operation when laying rail. The new machine is also said to eliminate the strains that cause rail to get out of gage, and to facilitate the placing and securing of the tie plates.

Co-developers and patent applicants are C. R. Wright, assistant chief engineer; W. M. S. Dunn, general roadmaster; and M. M. Stansbury, superintendent of maintenance of way shop and equipment, all of the Nickel Plate. The machine is being further developed and will be manufactured and sold by the Nordberg Manufacturing Company under the name Dunright track gaging machine.

The first model for the machine was built in March 1951 and was used by Nickel Plate employees in laying approximately 15 miles of rail last summer. On the basis of this experience, it has been estimated that the machine saved 60 man-hours of labor per day. But the outstanding result was said to be the achievement of a much more uniform track gage.

Maintenance officers of a number of railroads observed the machine in operation on the Nickel Plate last August. Following this inspection, one observer wrote:

"The interesting feature of this rail-laying job was the recently developed tie-plate gaging and spiking machine, a revolutionary idea . . . This machine is used to gage, drill and anchor-spike tie plates on every other tie, or every fourth or fifth tie as desired, thus allowing the crane to set in the rail to true gage. Finish spiking follows, with mechanical spike drivers being used."

The machine rides the track rail on a flanged dolly contoured to the rail head. A runner, or shoe, approximately eight feet long and a width to conform to the exact dimensions of the 132-lb. rail base, glides over the rail seats of the new plates, bringing them to exact gage. The tops of the plates are daubed ahead of time with a petroleum

Preliminary alignment of tie plates is done by a templet which, riding on one rail, has a runner shoe against which tie plates are aligned within 1/8 in. of gage

M-W Machines

grease to minimize friction as the machine moves forward.

After the tie plates are accurately set, with their outside shoulders tightly against the runner or shoe, the anchor-spike holes are bored and the anchor spikes are driven. For this purpose, the pilot machine is equipped with a 60-ft. air compressor to operate the air drill and the air hammer.

The crew that was used with this tie-plate gaging and spiking apparatus consisted of five men, as follows: One drill operator; one spike-driver operator; one groundman who lined up the plates tightly against the runner, and set the spikes after the holes had been drilled; and two laborers who pushed the machine forward. Prior to the development of the new track-gaging machine, a crew of 16 to 20 men was used to gage and spike the rail by hand in the rail-laying operation.

In the machine as it has been developed for the market by the Nordberg Manufacturing Company the shoe for positioning the tie plates can be adjusted to various rail-base widths and is equipped with rollers on its under side, which permit the shoe to slide easily along the tie-plates. Carried on the frame is a specially mounted Nordberg spike hammer and a tandem tie drill, each of which is powered by a separate gasoline engine.

The conviction on the Nickel Plate is that the former method of gaging rail, involving the use of hand gages and the sidewise movement of the unsecured rail to bring it to gage, while resulting in an approximation of the desired gage, nevertheless has not provided as high a degree of accuracy as is desired. The opinion also is that former methods have been disadvantageous in that their use has resulted in the setting up of strains in the rail and in the spikes securing the rail to the ties, which have acted to cause loss of gage after the rail was secured in position.

Co-developers of the Dunright track-gaging machine are seen here as they check drawings for their creation. Reading from left to right, they are: W. M. S. Dunn, general roadmaster; M. M. Stansbury, superintendent maintenance-of-way shop and equipment; and C. R. Wright, assistant chief engineer—all of the Nickel Plate Road

This close-up view of the Dunright gaging machine in operation shows how the runner or shoe glides over the rail seats of the new tie plates

With the tie plates held in place by the shoe, anchor-spike holes are bored and the spikes driven

Develop Tie-Renewal and Ballasting Aids on D. L. & W.

• Maintenance men on the Delaware, Lackawanna & Western have recently been active in developing machines to carry out various track-maintenance operations. Among these machines are a tie puller, a tie inserter and a ballast loader-distributor, all designed for operation with the "detour gangs" used on this road for making tie renewals and raising and surfacing track.

The tie puller consists of a self-propelled push car on which is mounted a gasoline-engine driven single-drum hoist and a boom which is fastened by means of a hinged connection to one side of the car. A cable wound on the drum is reeved through a pulley at the outer end of the boom and has a pair of tie tongs fastened to the free end. To remove a tie from the track the tongs are attached and the hoist is thrown into gear. It is reported that, using this machine, three men can do the work that on most jobs formerly required two five-men gangs.

Like the tie puller, the tie inserter is mounted on a push car, has a winch driven by a gasoline engine, and is self-propelled. To the end of a cable wound on the drum is attached a special tong that grips the outer end of a tie that is to be pulled into the track. Using four men to set the ties up and two to insert them, as many as 700 ties have been inserted in oneday with this outfit.

The basic ideas of design and operation incorporated in the Lackawanna's tie puller and tie inserter have been further developed and incorporated in a single machine, known as the Gandy, by the Nordberg Manufacturing Company.

The third machine developed on the Lackawanna—the ballast loader-distributor—is designed to provide a fast, economical method of picking up a windrow of ballast from the intertrack space and spreading it evenly across the track section ahead of an on-track tamping machine. Also a track-mounted, self-propelled machine, this unit has an inclined endless conveyor which picks up the ballast and dumps it into a hopper. Manually controlled gates in the bottom of the hopper make it possible to discharge the ballast as needed across the ballast section.

The Lackawanna tie puller has already proved its cost-saving ability in actual service. The road reports that three men using this unit can do the work that on most jobs formerly required the services of at least two five-man gangs

With the inserter a tie is pulled into position in the track by a cable fitted with a special tong for gripping the end of the tie. Four men set the ties up and two work with the machine

Requiring only three men—an operator and two laborers for handling the discharge gates—the ballast loader-distributor is said to do the work that, if done by hand, would require 25 men

Various Ballast-Working Units Developed on Santa Fe*

By John R. Rushmer

Roadway Engineer
Atchison, Topeka & Santa Fe System
Amarillo, Tex.

• In connection with track-surfacing work, skeletonizing has become more necessary than previously due to conditions, such as at bridges, tunnels, etc., which limit the raising of the track above existing levels without paying considerable penalties. A recent development of extreme simplicity, and now in use for this purpose, is the undertrack plow which skeletonizes at a high rate of production, and does a good job at very low cost. This device consists of a heavy steel plow with three V-shaped cutting edges, which is pulled by a locomotive by means of cables attached to movable outriggers mounted on a tow car. The tow car is also used to transport the plow, accessories and tools from job to job.

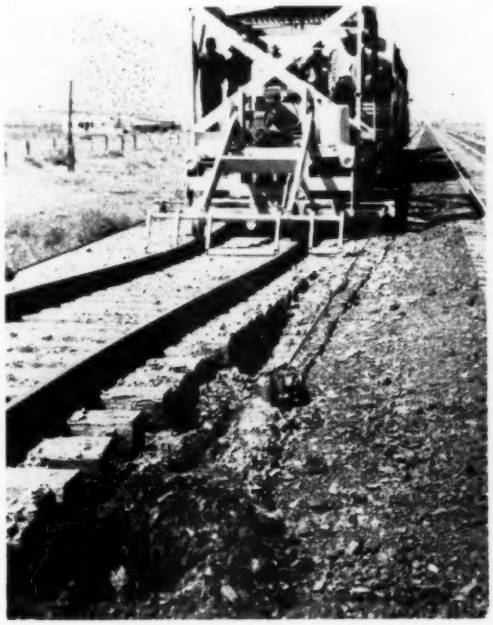
In order to use the undertrack plow, about 15 ft. of track must be skeletonized by hand or left over from a previous day's work without filling in. This previously prepared track is then jacked up at the four corners about 9 or 10 in. to permit the plow to be pulled or pushed into position beneath the ties. Then the cables are attached and the plow is pulled along under the track at a speed of 1½ to 4 m.p.h. The track rises ahead of the plow in vertical curves and is lowered behind it.

Most of the crib ballast falls down ahead of the forward blades of the plow but some of it is carried back and falls through holes in the top plate of the plow and is carried out by the center and back blades. In some very dirty and cemented ballast it is necessary to use a device called a crib agitator, which is attached to the tow car, and which has eccentrically mounted weights to break down ballast possessing such properties.

A drag bar is attached to the rear of the plow a short distance behind it to smooth the tie bed and dispose of any little piles of ballast which may accumulate.

* Adapted from an address presented before a recent meeting of the Maintenance of Way Club of Chicago.

The undertrack plow has three V-shaped edges. Ballast that rises over the forward blades falls through holes in the plate to be pushed aside by the other blades



The plow is pulled along under the track by cables extending to movable outriggers attached to a tow car which is drawn by a locomotive. Steering on curves is accomplished by manipulating the outrigger

A section of track after it had been skeletonized with the undertrack plow. For use where the ballast is very muddy a "crib agitator" is attached to the rear of the tow car (see picture at left) which utilizes eccentrically mounted weights for breaking up such ballast

The Santa Fe's intertrack conveyor car picks up ballast from the intertrack space and delivers it to the outside shoulder or casts it down the slope, whichever may be desired

One of two multiple four-gun pneumatic tampers developed on the Santa Fe. One man handles all four tampers which are arranged to tamp one end of a tie on both sides. Progress in coarse stone ballast is one end of a tie in one to two minutes

On the sides of the plow and at its rear are mounted extension blades which normally pick up the skeletonized ballast and place it in windrows far enough away from the tie ends so that new ballast may be dropped in advance of removal of the windrows of old ballast. The windrowed ballast may be plowed off to restore shoulders, plowed down the slopes, cleaned and returned to make a new ballast shoulder if of suitable quality, or it can be picked up and hauled away if necessary with a minimum of effort. In the majority of the cases of this nature, no other preparation is necessary.

The first cost of the equipment for this method of skeletonizing is very low, and the repair expense is also extremely low. The overall cost of skeletonizing is low because of these factors and because of the large footage skeletonized per hour. It has been customary to use only one work train to handle the plow and to unload and center-plow the dumped ballast, generally using one hour of work-train time to each ½ mile to 1 mile of track skeletonized and the balance of the work-train day for other work in the vicinity.

Another new machine that has been used in connection with the undertrack plow, and in connection with other surfacing operations, is called the intertrack conveyor car. It consists of a gondola car equipped with a large scoop, which folds into the car when not in use, and a transverse conveyor belt, together with a suitable source of power. The scoop digs ballast from one-half the width of the intertrack space and usually to or slightly below the bottoms of the ties. The ballast flows up the back of the scoop and topples over toward the center of the track and onto the conveyor belt which carries the material across the track under the car and deposits it, with the aid of an adjustable baffle, onto the shoulder or down the slope, as desired. The intertrack conveyor car is pulled by a locomotive at 1½ to 4 m.p.h. and, depending on conditions, requires one to three passes to remove the desired amount of ballast from the intertrack area.

The intertrack conveyor car and the undertrack plow each require only one operator and a couple of laborers for their actual operation, and usually each day use only part of the time of a ballast work train. Both machines clear trains on an adjacent track, but it is customary, as a matter of safety, to stop their operation during the passing of a train.

We are all familiar with recent developments in mechanical tamping equipment and with their economy as well as the advantages of uniform tamping. The result of all these machines has been better riding track at lower costs. However, the need for still better riding track, together with rising costs of labor and material, and high train speeds, has led to the development on the Sante Fe of two small multiple tampers. These are each powered by a small air compressor and use low consumption air tampers, and in each case they are operated by one man who handles all four tampers. The four tampers tamp one end of a tie, properly and uniformly and on both sides. When making a small spotting raise in coarse rock ballast one man has been able to tamp one end of a tie in one to two minutes. Under more favorable conditions, this work has been done in one-half to one minute. It is usually necessary to have a man forking ballast to the tamper and doing incidental work. It seems likely that these machines can be further developed so that two machines with two men can tamp a full tie simultaneously, without losing the ability to get the equipment off the track quickly in case of emergency.

Track Supervisor Describes Three of His Own Creations

By John L. McMillan
Track Supervisor
Gulf, Mobile & Ohio
Springfield, Ohio

• Over a period of years the writer has developed a number of mechanical aids that have proved helpful in carrying out various types of maintenance work. Three of these—a motor-car operated slip for building up the subgrade, a heavy-duty push car with a low center of gravity, and stand-up sighting equipment for surfacing track—are described below:

Motor-Car Operated Slip for Building Subgrade.—Quite a bit can be done sometimes with a combination of means at hand with slight expense. This was found to be true in rigging the equipment pictured at the right, for moving banking material at less cost than by hand. The slip cost $15 and the two pulley blocks $18. The rest of the material was available on the railroad.

The equipment consists of a common slip, 100 ft. of ½-in. steel cable, one 6-in. double block, one 8-in. single block, a short chain and a three-piece wood platform with handles, bolts and bottom angle irons. Two section motor cars were used together for power.

The platform was made with two 3-in. by 10-in. planks 57-in. long, positioned parallel to the rails as pictured. The top cross timber is a 3-in. by 10-in. piece 54-in. long. The double block is hooked into the loop of a chain fitted to one end of the cross timber. One end of the cable is hooked on to the rear motor car at the coupler opening and the other end is passed around the lower wheel of the double block, then around the wheel of the single block, then around the upper wheel of the double block, after which it is fastened to the inside end of the single block. To resist movement in the direction of pull, a piece of 3-in. angle iron is fastened underneath each of the parallel planks at right angles to them. These angles are intended to bear against a tie.

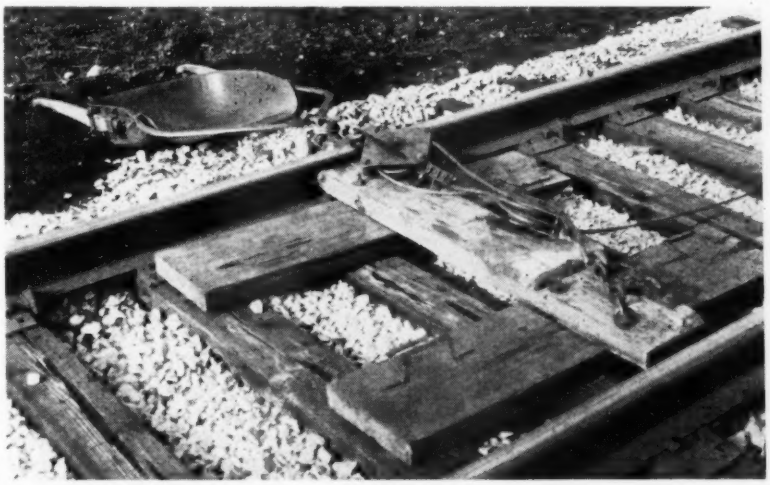
In operation the slip is set out in front of the platform on the right of way as far back as desired. As the motor cars move forward the slip is drawn toward the track and dumped, at which time the cars are stopped.

Heavy-Duty Push Car With Low Center of Gravity.—Haphazard means for loading and transporting heavy machinery are unsafe. Also there is no advantage in wasting labor, time and material in building shaky ramps to load such machinery on standard push cars which may soon be ruined. Low cars of rugged construction are needed and when materials to build them are on hand on all railroads there is added incentive to proceed.

The one pictured below was built with used material to expedite the safe transport and use of a Type KRC-12-Ingersoll-Rand 12-tool air-tamping machine.

A glance at the picture will reveal the obvious advantage of the "low boy," but there are other advantages not so obvious. Because only a minute is needed to load or unload the machine at any crossing or setoff, it can be used loaded, under flag protection, at locations that are inaccessible to off-track equipment, such as on high fills with narrow shoulders. The machine and car can be pushed by one man who may also be the operator.

The "low boy" was made with used 16-in. push-car wheels, complete with axles and bearings. Sections of used brake-beam angle



Block-and-cable arrangement for operating a slip. Cable from motor cars passes around lower wheel of the double block, then around the wheel of the single block, thence around upper wheel of double block and then back to the single block

Two section motor cars furnish power for operation of the slip. According to Mr. McMillan the time for building each 39-ft. length of embankment on this job was 11 min. The best time to use the equipment is when material is either moist or loose

irons were set and bolted down on top the bearings on each corner. Sections of secondhand No. 2 bridle rods were fixed to the center of the angle irons to provide a hanger at each corner. Two lengths of secondhand 70-lb. rail were suspended in an inverted position from the hangers. Four tie rods were used at right angles to the beams to hold the bearing housings against the thrust collars. A removable wood platform with provision against lateral or longitudinal movement, was placed on the inverted rails to carry the load. A center bottom tie rod and two rods for the tow ends, with side straps or brackets, together with the center coupler straps, complete the list of main parts. The pairs of wheels at the extreme ends have differential axles; the other two sets of wheels have solid axles.

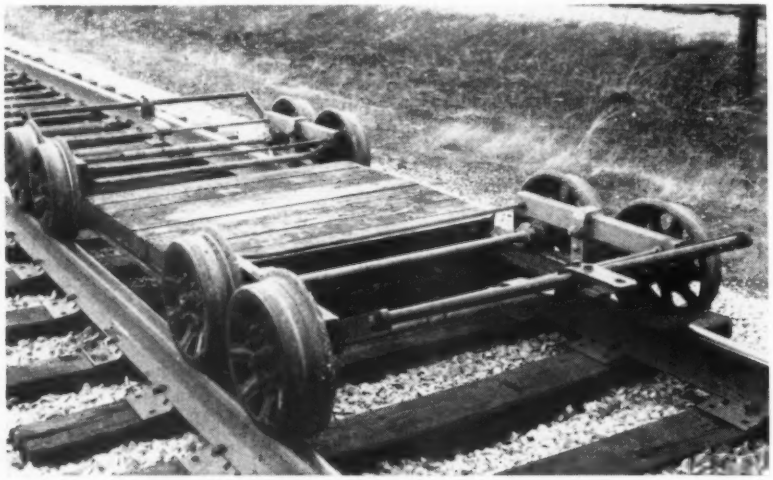
Loading the machine on the "low boy" is accomplished by laying 4-ft. sections of 3-in. and 5-in. timbers in front of the treads to serve as a ramp. Unloading is accomplished in the same manner.

Stand-Up Sighting Equipment for Surfacing Track.—High sighting equipment has been made in different ways, the desire being to get away from the prone method of sighting, which evolved from the days when sighting was done along the rail without the aid of equipment. The writer has developed high sighting equipment which consists of a sighting upright with a four-power rifle scope, an intermediate upright on a level board, and a spot-board upright. These devices are used in the same manner as conventional equipment but from a standing position.

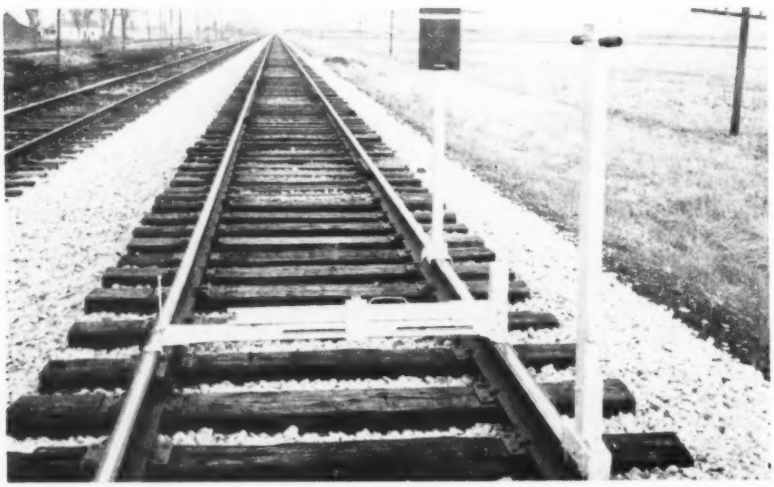
The sighting upright is a piece of clear cypress, 3½ in. by 1¾ in., 54 in. in length. A ¾-in. hole was bored 2 in. (center of hole) from the top of the upright through the center of the 3½-in. width. The 2 in. was then sawed off and fitted to the upright with hinges and a hook and eye. This provided a cap to hold the scope in place and on a line parallel with the rail and 52 in. above it. The lower end of the upright is boxed with blocks on each side of the main piece to provide a footing 11 in. long. Two small strap irons extend 1½ in. below the footing on one side, and a strap with spring pressure extends 1½ in. below the top of rail on the opposite side.

The upright on the level board is made so that it can be lowered when not in use. The top edge is 52 in. above the top of rail. This upright is made of a piece of 1-in. by 2¾-in. cypress. The lower end is pinned between two uprights of sheet metal 12 in. high and 3 in. wide, made out of stock ¼ in. thick. The level board is fitted with a back and clamp so that it can be carried by a handle on the upright when the latter is in the folded position. The sighting edge of the upright has been rounded out and a No. 18 wire stretched across the top and painted black.

The spot board is made of a piece of ¼-in. plywood 15¾ in. by 9¾ in. in size, and is boxed in back so that it can be moved on its upright which is a 2¾-in. by 1-in. piece, 72 in. long. The upright is lined off at right angles every ½ in. up to 16 in., the start of the marking being determined by the top of the white line on the board, which is 52 in. from the top of rail when the bottom of the board is on the zero line. The board is held to the staff by four set bolts that hold four small blocks against the staff. The bottom blocks have spring tension to hold them against the upright, while the top blocks are moved to the right or left to level the board. The front face of the upright has a center vertical line as has the spot board, and the bottom blocks are set to hold the spot board on the vertical line of the staff. The spot board upright is fixed to a U base by two angle irons. The U base is held to the rail head by a screw bolt.



This heavy-duty "low boy" push car was developed to expedite the safe transport and use of a 12-tool crawler-mounted compressor for operating pneumatic tampers



The stand-up sighting equipment consists of a sighting upright, an intermediate upupright on level board (shown in folded position) and spot-board upright (background)

What the Manufacturers Think...

How to Get More Out of Your Machines

Frank expressions of opinion from eleven supply men give their ideas regarding the steps that are being overlooked or should be taken by the railroads to assure that maintenance-of-way work equipment will be used most effectively.

• The people who manufacture and sell maintenance-of-way work equipment to the railroads are naturally extremely anxious that their machines give a good account of themselves, because that means satisfied customers—and satisfied customers mean repeat orders. Being thus vitally interested in the performance of their equipment in the field the manufacturers are close observers of all factors having a bearing on this performance. It is to be expected, therefore, that they would have rather definite ideas regarding the practices in the care and use of their machines that will give the best results.

Aside from his interest in the

Cites Several Undesirable Practices

"In one case two of our machines were being used on a job only three hours out of each day, whereas one unit, if used all day, would have sufficed. This would have made it possible to use the second machine to good advantage with another gang. Thus, the production of 3 to 4 hr. per machine per day was totally lost. Instructions for operating the equipment are generally requested, yet in many cases new operators are not given time to read even the basic instructions given on a metal plate attached to the machine. The result, of course, is inferior performance.

"Machines needing only minor repairs or adjustment are frequently loaded and shipped hundreds of miles to a central shop at a time when they can ill be spared. Field men could probably make most of these repairs in a few hours at a great saving. In this event the machine down-time would be 4 to 5 hr. instead of 2 to 3 weeks if the unit is sent to the shop.

"With the usual few exceptions, maintenance machinery is built in comparatively small lots and consequently must be priced higher than high-production items; therefore, proper lubrication, care and maintenance (which are often sadly lacking) are very important."

Would Stop Transfer of Smaller Units

"In my travels around the country, one of the most undesirable practices I encounter is that of transferring equipment from one division to another. When equipment is used only on one division, there is usually a division mechanic responsible for all equipment in that territory, and he usually works very closely with the machine operators. Between them they take pride in keeping their machines in good working order, that is, clean, well-lubricated and greased.

"In instances where equipment is transferred all over the railroad, the element of divided responsibility enters in; the usual reaction is to get a particular job done with the machine if it holds together, and the attitude is 'let the other fellow fix it up when he gets it.'

"I realize the railroads are handicapped because of men being constantly bumped from one job to another. However, it is my belief that the purchase of a few more pieces of equipment, especially the smaller maintenance items, for assignment to specific territories, would greatly reduce repair costs, and result in longer service life. Above all else, keeping equipment clean and well lubricated is where the largest economies can be effected."

Wants Specialists Put in Charge

"The increased use of work equipment in recent years has outgrown the work-equipment department personnel. In order to maintain and supervise the use of this equipment properly a sufficient number of qualified men should be available. As a whole it has been found that most roads are confronted with this problem.

"Due to the type of work equipment now in use it would seem that specialists should have direct supervision of its care and use. Instead we find this responsibility placed on the shoulders of roadmasters or track supervisors. As a rule these men have never had the opportunity to study the proper uses of this equipment. As a result it is often improperly applied with dire results.

"As a rule, because of his lack of knowledge of the equipment, the roadmaster will place the operator in charge of the work. The operator means well, but due to his insufficient training and instructions as to the machine itself and/or the work to be done, he does things which are definitely harmful to the machine. This adds to the down time of the unit.

"Manufacturers provide instruction books, literature as to the proper use of the machine and other data. Due to present divided responsibility, as the machine moves from place to place, this important material becomes lost or misplaced. This places the roadmaster and operator in an unfortunate position, with the result that serious damage to the unit or unnecessary work stoppage occurs while waiting for additional data.

"Proper lubrication periods and proper lubricants for various parts of the machine are carefully indicated by the manufacturer. Almost any time you stop at a machine you find it is in need of lubrication. Why? Because the machine has been received from some other division, with no record of previous lubrication, and no grease gun. Furthermore, since it is to remain with this operator only a couple of days, he takes the chance that it will stand up until he is finished with it.

"Inspection in the field brings out the lack of proper repairs. Certainly, valuable equipment such as this should be given proper inspection for necessary repairs. This would permit the salvage of certain worn parts by welding or other processes. Also, replacement of worn parts at the proper time will often save irreparable damage to more important parts or entire assemblies.

"Facilities for handling fuel for these machines are generally inadequate with the result that dirty fuel is permitted to enter the fuel systems. This results in poor performance of the engine, to say nothing of the severe damage that may be done to its pistons, cylinder walls or liners."

Sees Need for Preventive Maintenance

"I have always found maintenance engineers and work equipment supervisors highly conscious of the difficulties involved in using equipment properly. Manufacturers, likewise, are always striving for better working conditions and proper care for their equipment. I believe that manufacturers receive the finest cooperation from the railroads in the application of existing and newly developed machines. Companies well established in the manufacture of track-maintenance equipment have, for the most part, managed to establish organizations competent to cope with the difficult task of servicing machines scattered over the entire railway network.

"It is interesting to note that the construction industry, faced with a somewhat similar problem, has been putting great emphasis on the need for preventive maintenance. It is increasingly evident that great potential savings can be made by such measures. I believe that the railroads could capitalize on such a program."

Asks More Time to Make Deliveries

"Current conditions and restrictions relative to the use of critical materials, together with the much longer lead time necessary for manufacturing, make the problem of supplying sufficient equipment rather difficult when the railroads do not allow ample time from the date of their order to the date on which delivery is requested.

"In the many years that we have been in this business we have had to anticipate the railroads' requirements as long as six months in advance, and then accept their orders for what might be called "off-the-shelf" delivery. This practice is practical in normal times, but in abnormal times, such as we are now experiencing, the problem becomes very difficult. I think that, if the railroads would find it possible to anticipate their equipment requirements at the present time anywhere from 9 to 18 months in advance of their needs, they would be assured of getting the machines when they are needed. While I can appreciate that this might involve changes in budget and fiscal policies, I do think that the results would be worth the effort."

problem the supply man has the further advantage that he usually travels widely, and hence has an opportunity to observe the practices in effect on various railroads. He is thus not only in a position to evaluate and compare but also to obtain general impressions regarding those shortcomings in the care and use of equipment that are more or less common to the railroads of the country as a whole.

With the thought that the observations and opinions of the manufacturers on this subject would be of interest and value to railroad men, a number of them were asked to put their ideas into writing. To encourage frank discussion of the subject it was stipulated that the contributions would be presented anonymously. Eleven replies were received all of which are presented on these pages, each under a separate title. In several cases it was necessary to shorten the contributions somewhat to permit them to be fitted into the space that was available.

Careful reading of the letters will reveal that they present a re-

Must Make Careful Preparations

"In many cases, it is apparent that increased output could be obtained from machines if their use was to be more carefully planned in advance. For various operations, tracks on which work is to be done have to be prepared prior to the operation of the equipment. For instance, when rejuvenating the ballast through integral ballast cleaning, the track has to be raised to the proper height for a certain distance ahead of the machine. This distance depends on various conditions, including the capacity of the ballast cleaner, which should always be used in full.

"The forces for these various preliminary operations should be accurately defined and adjusted, so as to deliver to the mechanized cleaner the right amount of track, neither more—which would cause stoppage of the gangs ahead—nor less—which would cause stoppage of the machine—than it can normally handle working at full normal efficiency. Similarly in tamping operations, which, after all, consist of merely stabilizing previously prepared track; the track should be accurately surfaced, and alined in lengths to match the normal output of the tamper to be used. The goal of proper utilization of equipment requires full cooperation and understanding between the maintenance and traffic departments, and also close liaison with the machinery manufacturers."

Give M/W Department Full Control

"Railroad departments concerned with maintenance of way must, of course, have full control over the field maintenance of equipment, and it is even more important that they control the major reconditioning work that is done annually or as needed. Such control must encompass the decision as to the amount of repair work that is to be undertaken, the authority and ability to get necessary parts when needed, and the scheduling of the work through whatever shop is to do it. Obviously, such control is exercised only if the maintenance-of-way department has a supervisor of work equipment who has sufficient authority to see that the field maintenance of machines is carried out as needed. Shop repairs are best handled in a shop under the supervision of the maintenance-of-way department rather than in the shops of other departments; however, the vital element here is that the maintenance-of-way department must have full control. It is a matter of matching responsibility with authority.

"Management benefits in so many ways that it cannot afford to split responsibility and authority, as is still being done on some roads."

Emphasizes Need for Good Planning

"My comments will apply generally to the heavier on-track work equipment. The railroad officer in charge, whether a work-train foreman, track supervisor or roadmaster, should be familiar with the equipment under his jurisdiction—its operation and capacity and the type of work which it is designed to perform. He should be sure that the equipment is in the very best operating condition and, further, that it is accompanied by all available attachments and that they are in good working order.

"The work should be thoroughly planned and scheduled ahead of time. If a work-train crew is necessary the maintenance officer in charge should consult with the conductor as to train schedules, advising the conductor as to the estimated time required to complete each operation at a given point, and then decide on the best way to utilize the track during the time it is available. The work-equipment operator should be fully advised regarding the nature of the work involved so that he will have his equipment ready for instant service on arrival at the work location.

"These comments may seem academic; however, with a good start in the morning and everybody knowing what is expected of him, the work will usually proceed smoothly throughout the day. By the same token, if the work is not started promptly after the equipment arrives on a job, if the operation is poorly organized, and if the men are not properly advised regarding their duties, it's usually a pretty hard task for the supervisor to get the work progressing at the proper tempo—one that will follow through to quitting time."

markable unanimity of thought regarding several aspects of the problem. The value of well-trained operators, of adequate supervision, of proper lubrication, of taking care of minor repairs promptly in the field, of careful advance planning, and of preventive maintenance—these and other points are all mentioned in two or more of the replies. The reader will, moreover, quickly acquire the impression that, in the minds of at least most of the manufacturers represented in this symposium, the railroads as a whole are still not doing all the things that are necessary if they are to obtain the maximum return on the money they have invested in maintenance-of-way work equipment.

It will be noted that practically all of the viewpoints expressed here are in a constructive vein and that most of the suggestions made are of a practical nature. Nevertheless, it should not be assumed that this magazine is necessarily in accord with all the ideas and recommendations put forward in these contributions.

Would Seek to Correct Man Failures

"We feel that, by and large, the railroad forces are aware of detailed instructions and suggested methods of operation by the manufacturers of equipment. The manufacturers have spent considerable money in publishing booklets covering the use, care, and maintenance of their equipment, as well as bulletins and flyers on occasion, supplementing the original instructions. These articles represent a considerable investment of time and effort on the part of the manufacturers, and, as we see the picture, the railroads digress from them only to the extent that human error or other circumstances beyond human control occasion variations. As a suggested antidote for the ill, may we suggest more emphasis on the correction of human errors, which can be detected and handled in nearly everybody's organization."

Tells How He Would Reduce Lost Time

"The greatest loss of time in the use of maintenance machines can be charged to lack of systematic inspection and running repairs. The greater part of break-downs, and consequent delay, is caused by never shutting the machine down until it actually fails. Ordinary lubrication, tightening bolts, and the replacing of parts subject to heavy wear before they actually fail, would save 75 per cent of lost time and cost of maintenance.

"It seems very difficult on most railroads to get any attention at all paid to the machine by mechanics until it fails. We often find an operator many miles from the shop without a tool to tighten nuts, and he may have to wait days or even weeks for a mechanic to show up after a machine fails.

"Proper lubrication is most important, and the operator usually has time, when shut down for traffic reasons, to take care of this matter, but in many cases they don't do it. On our own machines, I know of cases where an hour's shutdown would have saved days of delay. Some machines operate at one-half the repair cost and get 50 per cent more work done per season than similar machines working under comparable conditions. The reason is that they happen to have a first-class operator, or more and better mechanical supervision."

Would Correct Various Shortcomings

"There is no question but that substantial savings are possible through the efficient use of any track maintenance machine, but, to get the most out of any machine, it must be efficiently used. Efficient use is obtainable only through efficient operation and maintenance. The only possible way to insure efficient operation and maintenance is a program which insists that operators be well trained and adequately supervised. Good operator training must start with an understanding of the operation, maintenance and lubrication manuals supplied by the manufacturers. Also there must be adequate supervision in the field, preferably by a machinery specialist, who has risen from the class of operator.

"A track supervisor or roadmaster is expected to be an expert in construction, maintenance, and heavy repair of track. He should not be expected to have full knowledge of what is necessary to repair, maintain and lubricate all of the maintenance equipment used by his forces. This is the first fact which must be recognized if M/W machines are to be efficiently used.

"I know of many railroads, large and small, with thousands or millions of dollars invested in track-maintenance machinery, which have no supervisory set-up for track maintenance machinery whatsoever other than their roadmasters. With such an arrangement machines are all too frequently continued in operation when they are in need of minor repairs, with the result that the minor defect soon becomes a major one. Our service engineers continually encounter machine operators who have never even seen a maufacturer's maintenance and operation manual. Ignorance may not be an excuse, but what can be expected of a machine, in either production or service life, if the man assigned to run it never saw the machine before and who has had absolutely no instruction in how to maintain it?

"Well-trained and adequately supervised operators can save the railroads thousands of dollars a year in repair bills. They can also greatly increase the productivity of equipment Proper lubrication and preventive maintenance increase the interval between major shop repairs which are always costly. This in turn would reduce the repair-shop load.

"While on the subject of shop repairs, let's talk about a waste which always seems to occur here. Many railroads ship a machine to the repair shop without giving the shop any information at all as to why the machine was sent in or what is wrong with it. Frequently a machine is torn down completely at the shop when all that was needed was an engine overhaul. It doesn't make sense to me that a machine should arbitrarily be torn completely apart and rebuilt in the shop just because it was sent to the shop for repairs, although this is the usual practice.

"Most railroads could learn a considerable lesson in machinery use from contractors who perform services on their lines. Such contractors usually do jobs cheaper than the railroads could do the same jobs themselves with their own personnel and equipment. Yet, the railroad owns equipment just like that used by the contractor. The contractor isn't in the work for fun. On the contrary, he usually makes a good profit. Why? The answer is simple. He has the right machinery on the job, his operators are adequately trained, his machinery and men are efficiently used and he gives the job better supervision. A contractor must know how much each machine he owns will do in a day, how much maintenance each machine requires and exactly what his costs will be on a given job. How many railroads have such information?

"In my opinion, there isn't one railroad in the country which could not effect considerable savings by securing answers to the following questions:

1. Are we actually securing the savings that we said a certain machine, if purchased, would produce?
2. Comparing the dollars invested in motive power with the dollars invested in M/W equipment, are we providing enough technical supervision of the M/W equipment?
3. What training are we giving our machine operators? Is this sufficient considering the money invested?
4. How close is the co-operation between field and shop personnel? Could shop expenses be reduced if this co-operation were better?"

New Era in Spray

Sights like this are becoming increasingly difficult to find

• Railroads are more "weed conscious" now than ever before. This attitude seems to stem partly from a growing appreciation of the need for controlling vegetation growth in the track and roadbed areas as a measure for promoting safety and economical maintenance, plus a desire to enhance the appearance of the property from fence to fence. More important, however, in bringing about this increased interest in weed control has been the introduction of new chemicals for this purpose, including those of the hormone type for killing broad-leaved plants and shrubs. The availability of these chemicals opened the way for the railroads to do a selective job of vegetation control on the right of way outside the roadbed section, that is, to eradicate the obnoxious plants and shrubs while at the same

Reade Manufacturing Company, Inc., Jersey City, N.J.—Spray car units owned by this company are being completely modernized so that they can be adapted to the spraying of brush as well as weeds. For brush spraying a series of booms, each terminating in a nozzle, is mounted on each side of the spray car. Two other booms with nozzles protrude through the roof of the car, one near each side. These latter booms are retractable, and all of them are adjustable as to position to permit the sprays to be directed to any part of the right of way as needed. The picture at the left shows one of the cars spraying brush while the one above illustrates a multiple-track weed-spraying operation.

Equipment for Vegetation Control

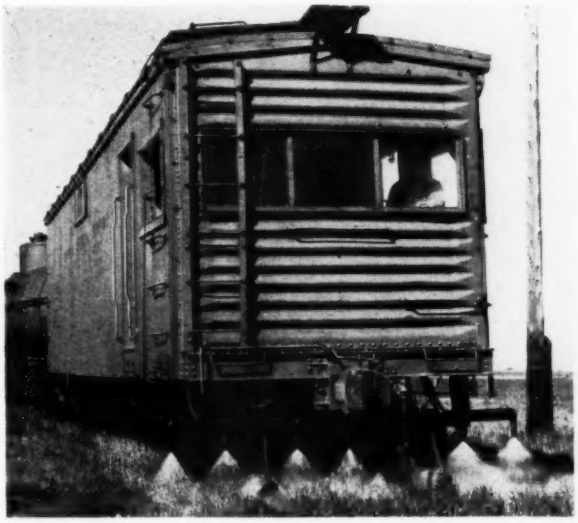
time not injuring any of the more desirable grasses.

Thus, the means were at hand to permit the railroads to cope more fully with the problem of vegetation control; it remained to develop suitable equipment for the effective application of the new chemicals. This posed a special problem, partly because of the lateral distances from the track over which the applications had to be made, and partly because of the desirability of handling several types of chemicals with the same equipment.

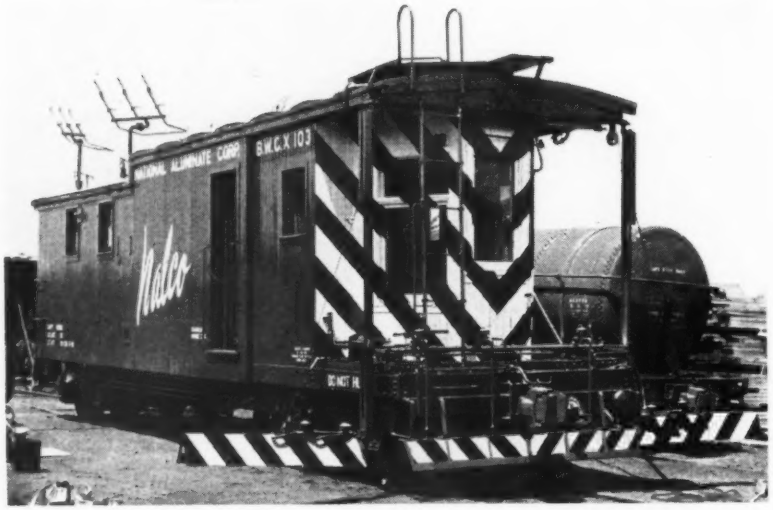
A number of railroads have devised weed-spray equipment of their own, some of which is designed for application of the chemicals over the width of the right of way. The independent companies in the business of rendering weed-control service to the railroads have also been active in this direction, with the result that phenomenal advances in the spray equipment have taken place, not only in connection with right-of-way spraying but also for applying chemicals in the track and roadbed area. On these and the following pages is presented a summary, largely pictorial, of the present equipment used or offered by most of the commercial concerns operating in this field.

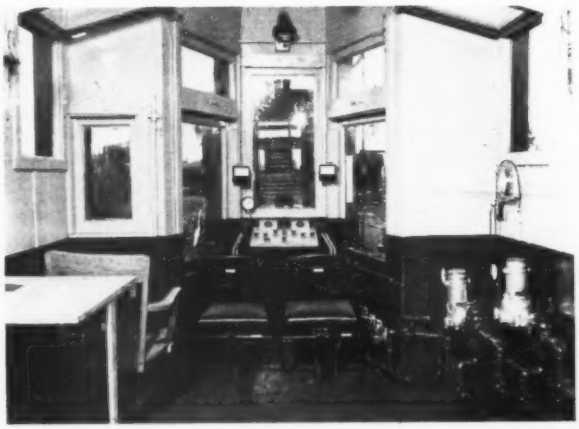
All except one of the companies represented in this feature offer their equipment for use by the railroads on a contract basis, normally providing not only the equipment but also the personnel needed to operate it, as well as the chemicals used. The one exception (Fairmont Railway Motors, Inc.) manufacturers its weed-spray machines for sale to the railroads.

Chipman Chemical Company, Bound Brook, N.J.—Shown in operation in these three views is the latest equipment developed by this company for weed and brush control. Equipment for applying brush killer (right) embodies four swivel turrets—one on each corner of the spray-car roof—which permit spraying in any plane. Each turret has four nozzles which are adjustable to permit the liquid to be discharged as a stream or in the form of fog. There are also two high-pressure guns for spot work. For spraying shoulders (below right) hinged booms are provided. Standard equipment covers 20-ft. width, but extension booms can be added. Spraying of track is shown below.



Weed-Spraying Equipment (Cont'd)



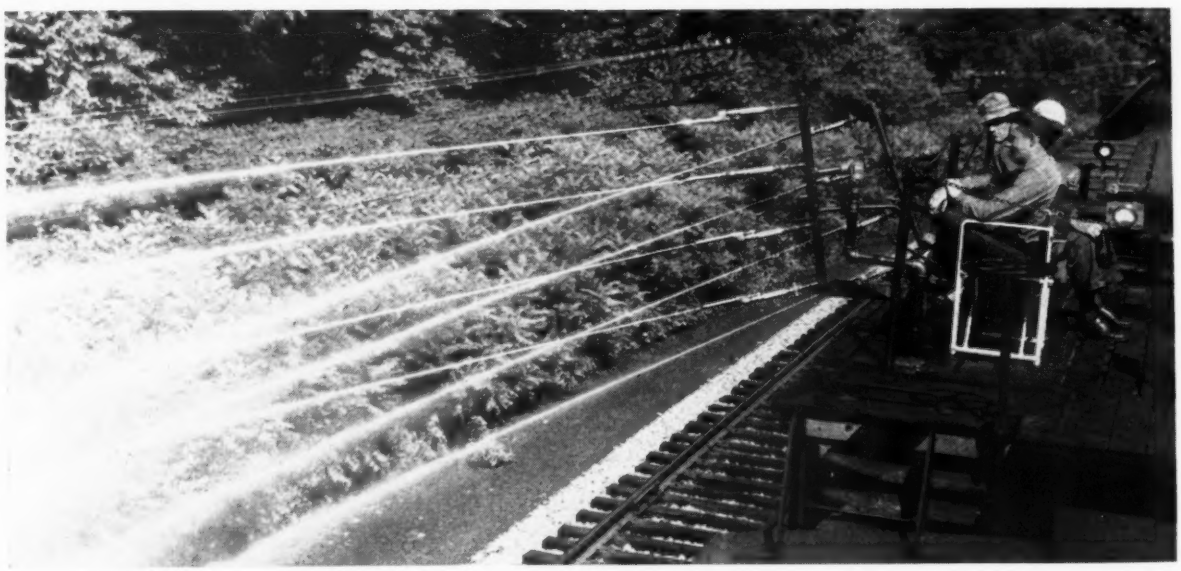


Above — Nalco BWCX 103 weed and brush-control spray car. Nozzles on each of the turrets on top of the car at the rear have been increased to four since this view was taken. Left—showing the various control and metering devices on the interior of the front end of the car. Two indicators tell the operator at a glance how many gallons per minute of chemicals are being discharged from the various nozzles on the car

National Aluminate Corporation, Chicago.—This company operates six cars for spraying vegetation along railroad right of ways. Four of these are equipped only for weed control, one for brush control only and one—Nalco Car B.W. C.X. 103—for both weed and brush control spraying. The latter is illustrated by the three views on this page. Weed and brush-control chemicals are not sprayed simultaneously. Different speeds are required for each type of spraying, and the spray car is always pushed for weed spraying, and pulled for spraying brush.

Weed-control spray nozzles are located in a fixed housing extending across the full width of the front of the car. Additional nozzles housed in hinged spray booms give an over-all spray path 24 ft. wide. Hydraulic controls are such that any or all of the 24-ft. width can be sprayed as desired. Booms can also be raised and lowered to keep sprays at the prescribed height above vegetation and to clear obstructions. Operator can also swing the booms in to a position parallel with the car to avoid telephone poles, bridge structures, etc.

All Nalco cars are equipped with speed indicators, and special communication systems make it possible for the spray-car operator to keep in close touch with the locomotive engineer. The metering and pumping equipment on these cars is installed in duplicate so that two different weed-control formulas may be applied simultaneously if required by the nature of the vegetation.

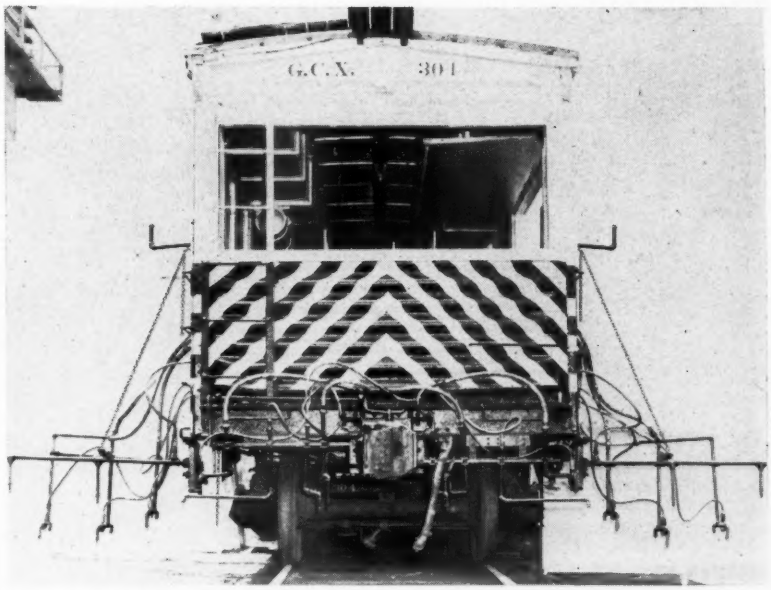


For brush spraying there are four 4-nozzle turrets equipped with swivel-type fittings to facilitate directional control

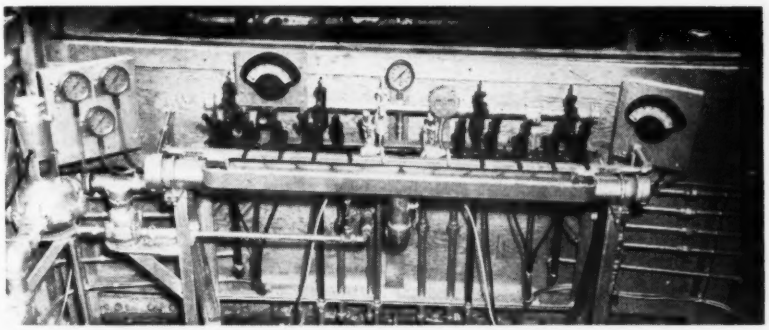
General Chemical Division, Allied Chemical & Dye Corp., New York.—This company's equipment for weed control within the track and roadbed area embodies multiple spray heads consisting of a primary set of spray nozzles for the bulk application of mixtures under normal conditions; secondary spray nozzles for duplicating sections of the spray pattern whenever excessive or dense growth of resistant grasses or weeds may require additional dosage; and a third set of spray nozzles for use where oil soluble chemicals are employed and cannot for any reason be incorporated in water mixtures.

The flow lines supplying these spray heads are provided with injection apparatus so that chemicals such as 2,4-D or 2,4,5-T, may be instantaneously added to the mixture or shut off when spray trains are passing locations where vulnerable agricultural crops adjacent to the right of way may be injured by contact with spray drift. This company points out that pumping systems are more complex owing partly to the necessity of pumping separate mixtures to several spray heads.

For brush control, high-pressure spray guns are used, which are similar to the long-trajectory nozzles used for ornamental trees or orchards or forest-control spray work. For supplying these nozzles pumps having a capacity of 200 g.p.m. at a pressure of 250 to 700 p.s.i. are used. The spray guns are mounted on quadrants which may be adjusted instantaneously to suit conditions.

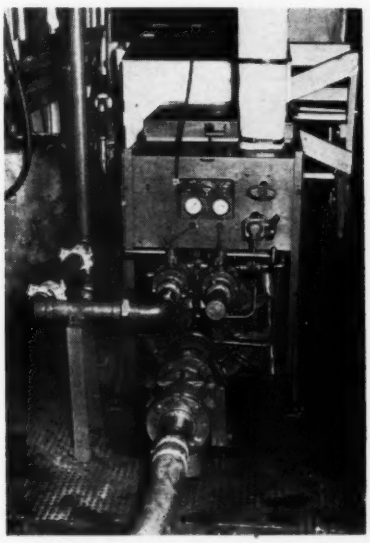


View of head-end of General Chemical's spray car, showing the nozzle arrangement for spraying a 20-ft. width. Three different sets of nozzles are provided here



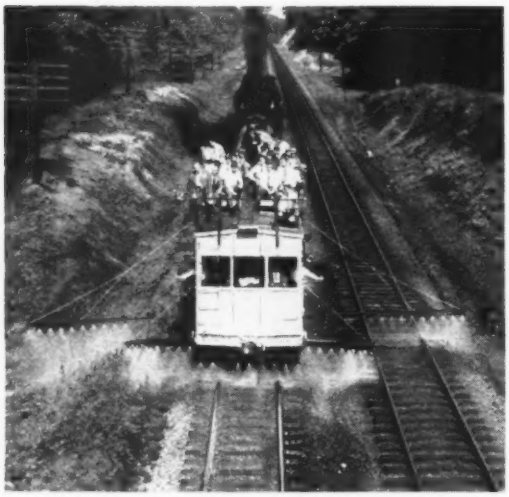
Showing the valve controls for primary nozzles at the head end of the car. Pressure gauges, electric speedometers and flow meters are also visible in this view

The spray guns used for brush control work are mounted on quadrants and are quickly adjustable to suit the typography of the right of way and other conditions

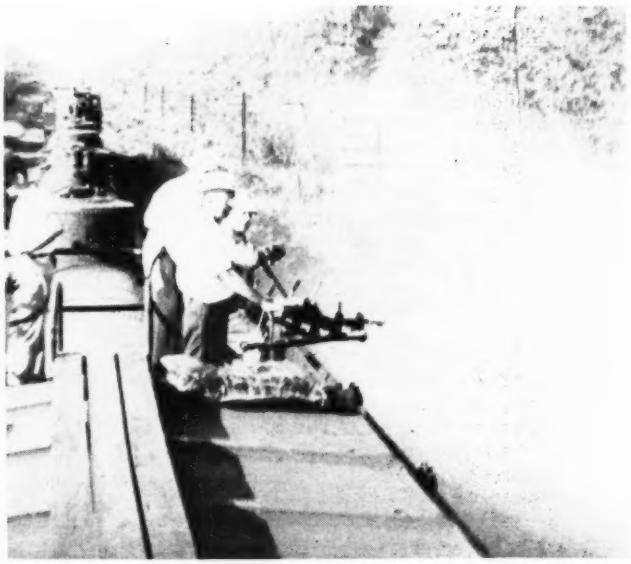


Brush spray pump has a capacity of 200 g.p.m. at pressures of 250-750 p.s.i.

Weed-Spraying Equipment (cont'd)



Spraying track and roadbed with a Bogle combination weed-spray and brush-control car. Covers widih of 42 ft.

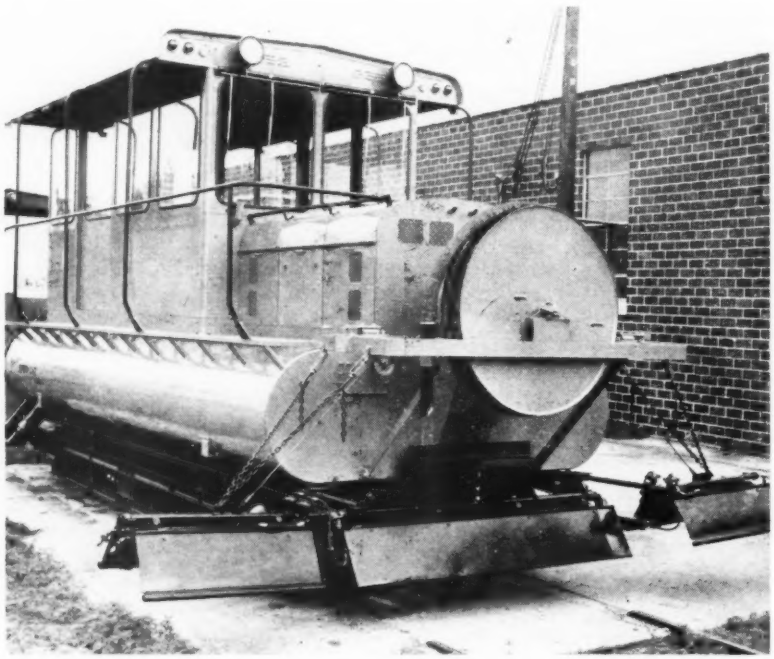


Movable and adjustable high-pressure guns, mounted in series on turrets, are used for making applications to brush on right of way

R. H. Bogle Company, Alexandria, Va.,—Spray cars operated by this company have been completely revamped with the result that each car is now designed to apply either roadbed weed killers or right-of-way brush killers. Applications to the roadbed are made by a system of manifold pipes and booms at the front of each car, which give a coverage of 42 ft. Controls make it possible to spray all or any part of this width and, also, to produce a greater volume where desired without changing the speed of the train. In addition, the system includes a set of "doublers" to provide for increased volume on specific areas.

Movable and adjustable high-pressure guns, mounted in series on flexible turrets on the roof of the spray car, are used for making applications to brush. These guns are set to apply chemical to the area between the extremity of the roadbed application and the right-of-way line, or up to 100 ft. from the track on either side.

Individual guns are available for special brush-killing problems. Pressures of 100-125 p.s.i. are normally used, but pressures up to 350 p.s.i. can be obtained.



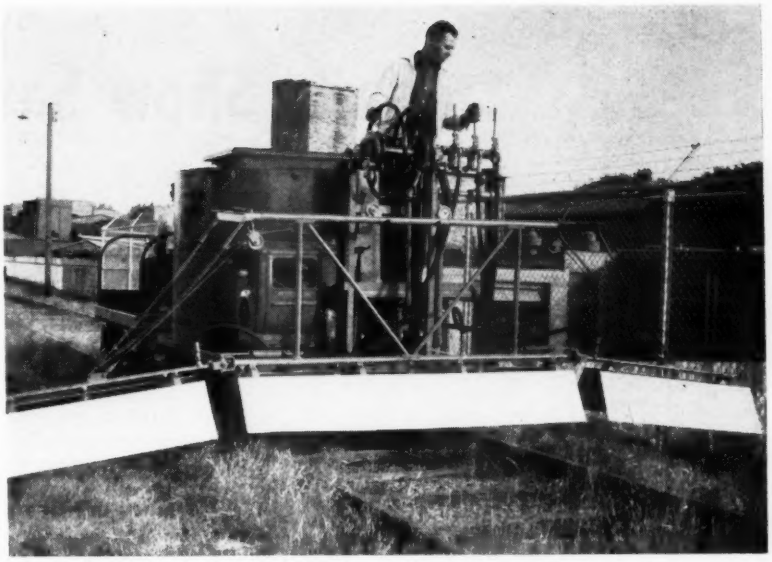
Capacity of the chemical tank on the Fairmont W66 Series A weed sprayer is 2600 gal.

Fairmont Railway Motors, Inc., Fairmont, Minn.—Among the several units of weed spray equipment manufactured by this company is the W66 Series A Weed Sprayer (left), which is a self-propelled, track-mounted unit for the application of liquid weed killers. This unit is powered by a 112-hp. engine and has four speeds in either direction. It has two pumps, each independently driven by a separate two-cylinder, air-cooled engine. One pump, with an output of 50 g.p.m., delivers the chemical to the spray nozzles, while the other, having an output of 100 g.p.m., is used for transferring liquids from tanks or tank cars into the tank on the machine, although when necessary this pump is also operated during spraying and serves to agitate the liquid in the tank by means of hydraulic jets. This machine is fitted with two sizes of nozzles arranged in tandem with separate controls, so that nozzles of either size may be used individually or both sizes used in tandem, as desired. Con-

trols are such that the center sections or the wings may be operated independently of each other as conditions require. Total spray width is 20 ft. Two 50-ft. extension hoses on reels are also provided.

Another Fairmont weed-spray unit is the W78 Series A spray car (right), which is a trailer-type unit intended primarily for use on branch and short lines, and side and yard tracks. Spray pressure on this unit is created by a 50-g.p.m. gasoline-engine driven pump. The machine has one set of spray nozzles, but the controls are such that the wings and the center section may be operated separately as desired. The total spray width is 16-ft.

Both the W66 Series A and the W78 Series A are intended for spraying weeds only. This company also has a track-mounted oil sprayer (W61 Series B) which can be adapted to weed spraying.

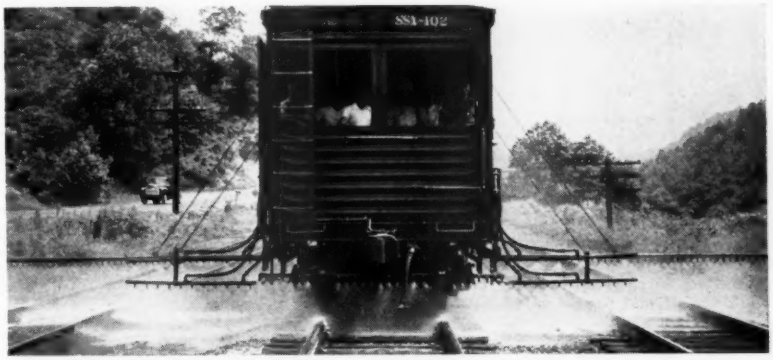


In the W78 Series A spray car tank capacity is 800 gal. Wings are raised manually

Spray Services, Inc., Huntington, W. Va.—This company has developed a combination roadbed and right-of-way sprayer in which the roadbed spray equipment (top right) consists of a large number of nozzles, in series, connected to individually controlled valves, permitting the selective spraying of the ballast section between the rails or the ends of the ties. Small extensions permit selective spraying on the outer edge of the ballast and on the berm. Total spray width may be varied between 16 and 28 ft. In addition, two large booms enable the spraying of a track on each side of the central track.

This equipment permits the use of a number of chemicals or a combination of chemicals, either in emulsion or water soluble form. In addition to the general grass and weed killers that are pumped from the mixing-tank cars through the spray equipment, other types of weed killers that may be more effective on certain types of vegetation are contained in two auxiliary tanks from which they may be injected instantly by a valve.

When the equipment is used as a right-of-way sprayer (below right) the spraying is done from a platform on which are four turrets of six guns each. These turrets, individually operated, can be traversed or tilted at an angle to the traversing plane, and, also, elevated or depressed. For spot spraying there are two small turrets with two nozzles each.



Spraying 3 tracks with Spray Services' combination roadbed and right-of-way sprayer

Brush spraying is done with four six-gun turrets adjustable in three directions

Charts Show Savings with Power

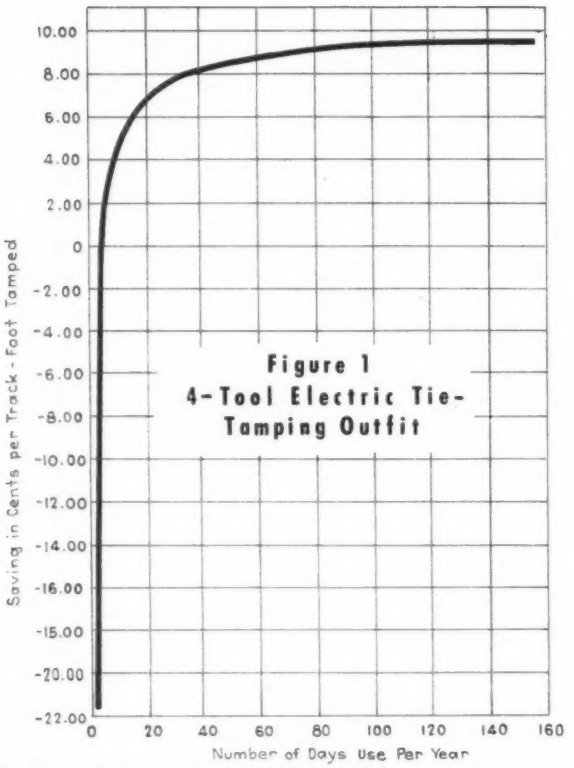
By PAUL J. CLAFFEY

Assistant Professor—Civil Engineering
The Catholic University of America
Washington, D.C.

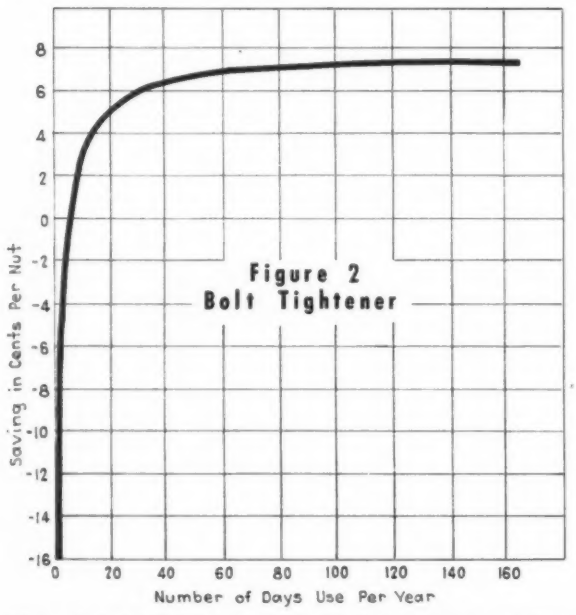
• Specifically, what is the extent of the savings that are produced through the use of various power track machines as compared with hand labor, and what is the relationship between these savings and the number of days during the year that the machines are in operation? Answers to these questions for specific machines in common use are contained in a thesis entitled "Cost Determination in the Use of Lightweight Machines for Track Maintenance on American Railroads," which was prepared by the writer in partial fulfillment of the requirements for the degree of Master of Arts in Economics.

In preparing the thesis reliable figures were compiled giving the actual cost and performance of a number of track machines that are in common use today. Based on the information for each machine, figures were developed to show the unit cost of performing the particular operation for which the machine was designed. Comparable figures were compiled on the cost of doing the same operation by hand. From these data a chart was prepared for each machine to show the manner in which the saving is influenced by the number of days during the year in which the machine is in operation.

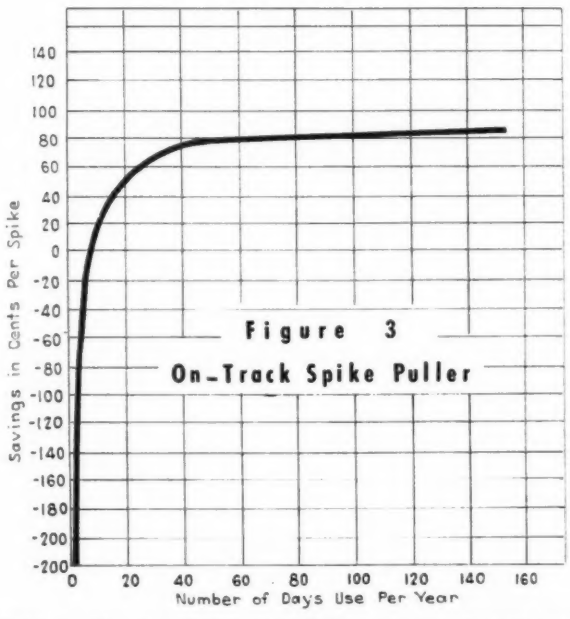
Charts for six of the machines studied—a four-tool electric vibratory tie tamping outfit, a bolt tightener, a spike puller, a rail drill, a rail saw and a spike driver—are reproduced on these pages. In figuring the cost of



Professor Claffey says that outfits of this type should be purchased for any group of trackmen that will use it on needed work for a total period of at least six working days per year



After a bolt tightener has been in use eight days per year there is a rapid increase for a time in the over-all savings produced



If this machine is used at least eight days per year the unit cost would be less than with hand labor, according to Prof. Claffey

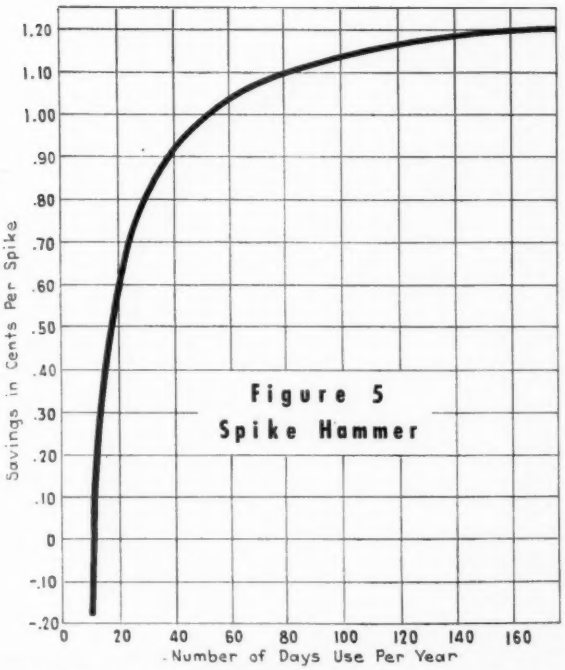
Track Machines

operation of each machine consideration was given to the initial cost of the unit, the interest on the investment figured at six per cent, depreciation, maintenance and repairs, fuel and labor. Although it can be shown that the use of machines in place of hand labor generally results in decreased compensation payments for injuries, the amount of this cost saving was not considered in the computations since it is dependent on such variable factors as the experience of the workers, the quality of the supervision, the condition of the equipment, and the conditions under which the work is performed.

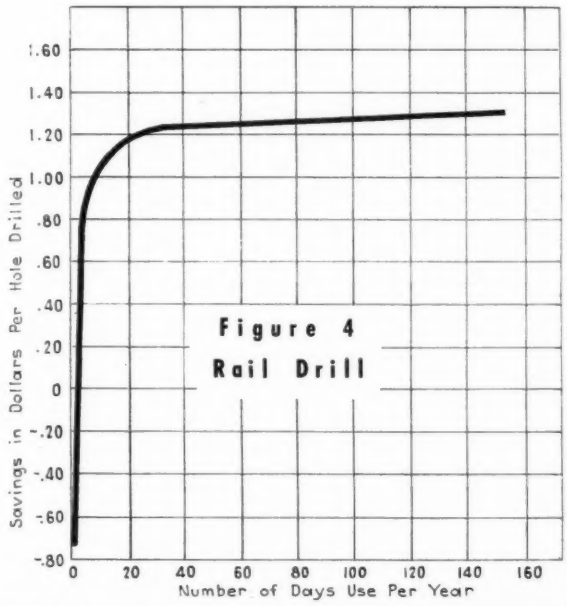
The unit cost of performing by hand the same work done by the machines remains the same regardless of the amount of work done. But the unit cost of doing the work with machines varies inversely with the number of days that the particular machine is used during the year. This is so because the annual interest, the depreciation and the cost of repairs must be assigned to the days of actual use; the more days the unit is in use the less will be the cost per day.

From an examination of the charts it is apparent that each of the machines must be used a certain minimum number of days before it begins to show a saving. After this point has been passed the saving in unit cost increases rapidly for a time with the number of days of use, after which it begins to level off as the "fixed charges" become diluted by the time element.

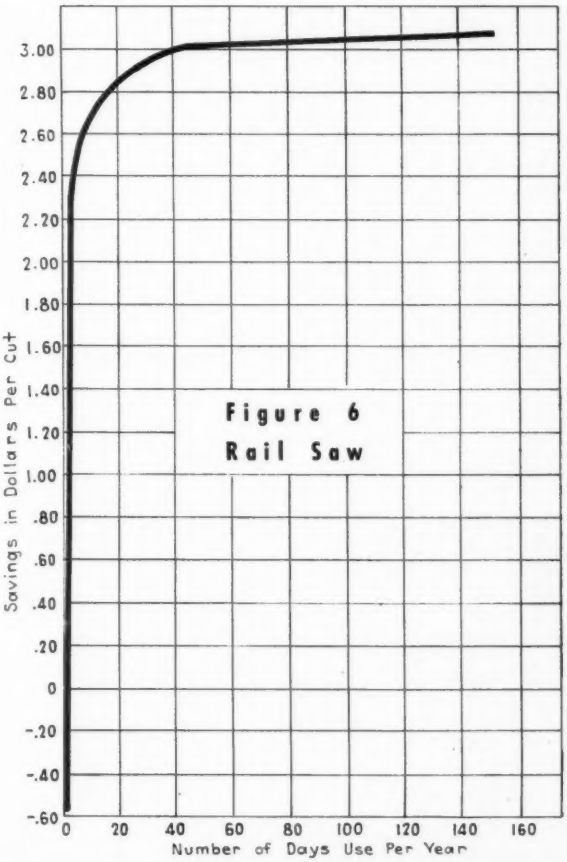
The chart for the four-tool electric vibratory tamping outfit (Fig. 1) shows that this machine begins to show a saving after six days of use. "Break-even" points for the other machines are as follows: Bolt tightener (Fig. 2) 8 days; spike puller (Fig. 3) 8 days; rail drill (Fig. 4) 2 days; spike driver (Fig. 5) 12 days; and the rail saw (Fig. 6) 2 days.



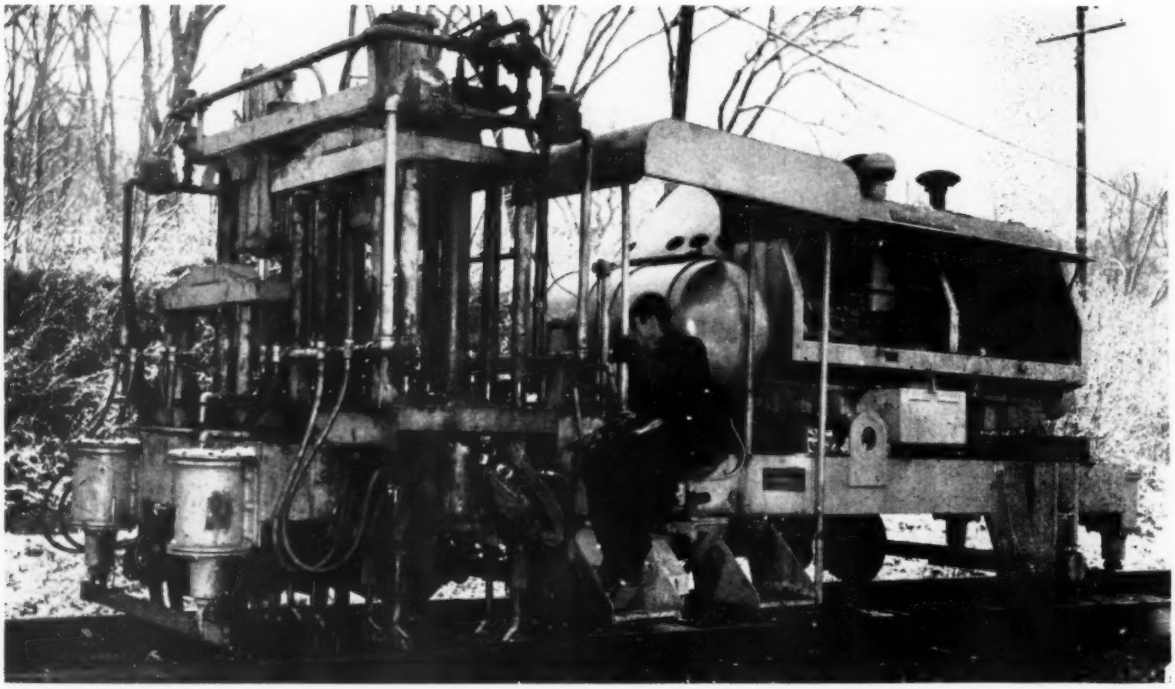
Savings with a power spike driver start after the machine has been in use 12 days. As with the other machines, the savings increase quite rapidly for a time before beginning to level off



Only two full days' use per year are necessary before the rail drill commences to show a saving as compared with hand labor



The power rail saw begins to show substantial savings after it has been in service a total of only two full days out of the year



The newly developed multiple-unit air-tramping machine shown here in action on the Chicago & North Western. The operator is spot-tamping the right side of the tie, while the tampers on the left side of the tamping machine are not being employed

Uses New Tamper for Both O

A newly developed 16-unit, split-crosshead, multiple air-tamping machine has performed satisfactorily in both operations on the North Western in territory where traffic density caused frequent interruptions to the tamping work.

• The Chicago & North Western began using a Railway Maintenance Corporation 16-unit, split-crosshead, multiple air-tamping machine on July 18, 1951, on an out-of-face surfacing job. Later, after this job had been finished, the same machine was used for spot-tamping work. The railroad reports that, in both instances, satisfactory results were obtained.

The track selected for the out-of-face operation was a four-mile stretch of the road's No. 3 main track beginning at Mile Post 15.8 at Elmhurst, Ill., and extending westward to M.P. 19.8 near Lombard. This piece of track is in suburban territory where station grounds are close together and where as many as 23 train interruptions occur during normal working hours.

This track is laid with 112-lb. rails, 39 ft. long, and the crossties are spaced 24 to the rail. The ties were in good condition so that it was not necessary for the surfacing gang to make tie renewals. Plans called for a general track raise of from 3 to 7 in. on stone ballast, ranging in size from ¾ to 1½ in. Raises over 5 in. were made in two lifts.

The entire operation of spotting the machine over the ties and control of the tamping action is handled by one man. The operator rides on the left side of the machine on a seat positioned over the outside of the rail. From this point he can see the tampers of both crossheads in operation and thus determine when to raise and lower them.

By moving forward a lever that controls the machine's propelling air motor, he causes the machine to advance to the next tie. When the tamping tools straddle the tie to be tamped, he releases this hand lever, which returns to the neutral position by spring action, and presses down on a foot brake for stopping the machine. When the two hand levers that control the crossheads are turned down, the crossheads and tamping tools are lowered and activated, thus compacting the ballast and drawing it up against the bottom of the tie. Nipping of the ties is not required.

For a lift of 3 to 4 in., it was found that generally three insertions of the tamping tools were sufficient for general tie tamping when raising track, although four insertions were made at the joint ties for extra compaction of the ballast. The second track lift was made with the same number of tool insertions. Between each insertion, the tools were entirely withdrawn from the ballast.

Although the machine is equipped with set-off wheels and air-operated set-off jacks, the North Western had no occasion to use them because sidings were generally available within easy running distance. As a general rule, the machine was run to a siding approximately 10 min. ahead of any train-arrival time.

The organization that was set up for this operation called for 25 men, although there were many days

What It Is; How It Works

The multiple-unit air-tamping machine, produced by the Railway Maintenance Corporation, Pittsburgh, Pa., is a self-propelled on-track machine, mounted on four wheels. It has a battery of 16 air tampers which are arranged on crossheads in two groups of 8, each group centered over a rail. The two groups, or crossheads, are controlled by separate levers and can be operated simultaneously or independently. The entire operation of the machine, i.e., the tamping crossheads and tools and the movement of the unit, is controlled by one operator.

The mounting of the crossheads is such that the tamping tools operate at an angle of 30 deg. with the rails and follow a predetermined cam-controlled path. Controlled pressures up to 700 lb. can be obtained on each tool, and a push-rod to each tamper contains a pre-loaded spring for equalizing the pressure on each of the 16 tools to within 2½ in. of each other under the ties. The ballast is filled and compacted for a distance of 16 in. outside and 12 in. inside of the rails in addition to the spaces under the rails.

The machine is equipped with a 315-c.f.m. diesel-driven air compressor which furnishes the power for raising and lowering the crosshead, for actuating the power tools, for two air-operated jacks used for set-off purposes, and for propelling the machine by an air motor through a three-speed transmission. The machine can travel in either direction at speeds from 6 to 30 m.p.h.

The tamping tools are activated when the cross head is lowered and follow a cam-controlled path to tamp under the ties

Out-of-Face Surfacing and Spot Work

when fewer than this number were available. The 25-man gang consisted of a foreman, an assistant foreman, a machine operator, and 22 laborers. With a full complement of men, the trackmen were apportioned as follows:

- 4 men digging holes for jacks, seating and raising 16 jacks (8 to a side), moving the level board and spotboard, and releasing and carrying the jacks forward
- 4 men removing rail anchors where necessary, straightening and spacing ties, and replacing rail anchors
- 4 men forking ballast from ties and shoulders to cribs
- 2 men forking ballast to the tamper
- 8 men working behind the machine, smoothing the ballast between rails, and lining and dressing track

The assistant foreman took a position near the head jacks for sighting on the spotboard when raising, and he also watched the level of the track behind him on the raised jacks, having corrections made

Air-actuated jacks are at the front of the machine for raising the unit when placing it on the set-off wheels and rails

In the spot-tamping operation the gang, working in advance of the machine, jacked up low spots, forked ballast to the cribs where the machine was to tamp, and gaged and lined the track where necessary

It was found that on curves, such as this location, the majority of spot-tamping work required was on the low side of the curve

when required. The section forces unloaded the ballast as needed and also furnished the flagmen for the surfacing gang. An engineer and a pilot conductor accompanied the machine, the latter employee keeping the gang posted as to when the machine could work and when it had to be placed in the clear for trains.

From figures kept on the performance of this gang it was developed that out of a total of 7,680 man-hours worked only 3,375 man-hours, or 44 per cent of the total, were spent in actual surfacing work, the remaining time being utilized to complete dressing and lining. Counting each lift as a single raise, 30,706 ft. of track was surfaced by this gang, which is the equivalent of 9.1 ft. per man-hour of labor while the machine was actually working and about 4 ft. for each hour that the machine was in service. The maximum rate of tamping by the machine was 390 ft. per hr., and the average rate was about 225 ft. per hr.

After the surfacing work had been completed, the machine was used for spot surfacing with a smaller crew. Because the machine has independent controls for the two crossheads, spot tamping could be carried out at joints on either rail as required, and also on slued ties.

In addition to the machine operator, who had previously worked the machine on the surfacing and rasing work, the spot-tamping gang consisted of a foreman, an assistant foreman, and nine trackmen. An engineer and a pilot conductor also accompanied the machine. The trackmen worked in advance of the machine with one track jack to a side, raising and fork tamping one tie of a low spot, forking ballast to the cribs where the machine was to tamp, "tailing-up" ballast shoulders, and lining and gaging where necessary. The rails were marked to show the machine operator the limits of each spot to be tamped.

The machine operator worked the independent crossheads on either side as called for by the marks on the rails. No more than two insertions of the tamping tools were necessary and frequently even one was sufficient for proper tamping. As with the out-of-face surfacing work, the spotting operation was plagued by traffic so that the machine actually averaged only 3 hr. 45 min. of work daily. In 7 days the machine worked over 1½ miles of track, spot-tamping part of it and tamping out-of-face two long curves included in the stretch. The rate of progress was about 300 ft. per hr. Because of the raising and surfacing of the two curves, this rate of progress cannot be called representative of the machine while engaged in spot-tamping work.

The machine has recently been turned over to another roadmaster for spot-tamping work on a track where the traffic is not quite so dense, permitting the unit to be worked from 5½ to 6 hr. per day. Here, with the same number of trackmen, the machine was able to spot tamp about ¾ mi. of track per day.

The North Western considers the performance of the tamper to be very satisfactory, especially in view of the difficult traffic conditions under which it has worked. The work was carried out under the general direction of E. C. Vandenburgh, chief engineer, and L. R. Lamport, engineer maintenance, and under the direct supervision of B. G. Packard, division engineer, N. H. Mass, roadmaster, and A. Netzel, roadmaster.

One of the mobile outfits on its way to a bridge repair job. The caravan consists (from left to right) of a station wagon, a house trailer, a crane truck, a transport trailer-truck (hauling in this case an emergency electric power plant unit not normally included in the outfit, but indispensable for night work), and the complete truck-mounted machine shop

Idea for the Railroads? . . .

Mobile Bridge-Repair Outfits Prove Effective in Highway Work

Truck-borne caravans, each including cranes, hauling units, machine shop and house trailers for employees, are employed for maintenance and emergency repairs by State of Florida.

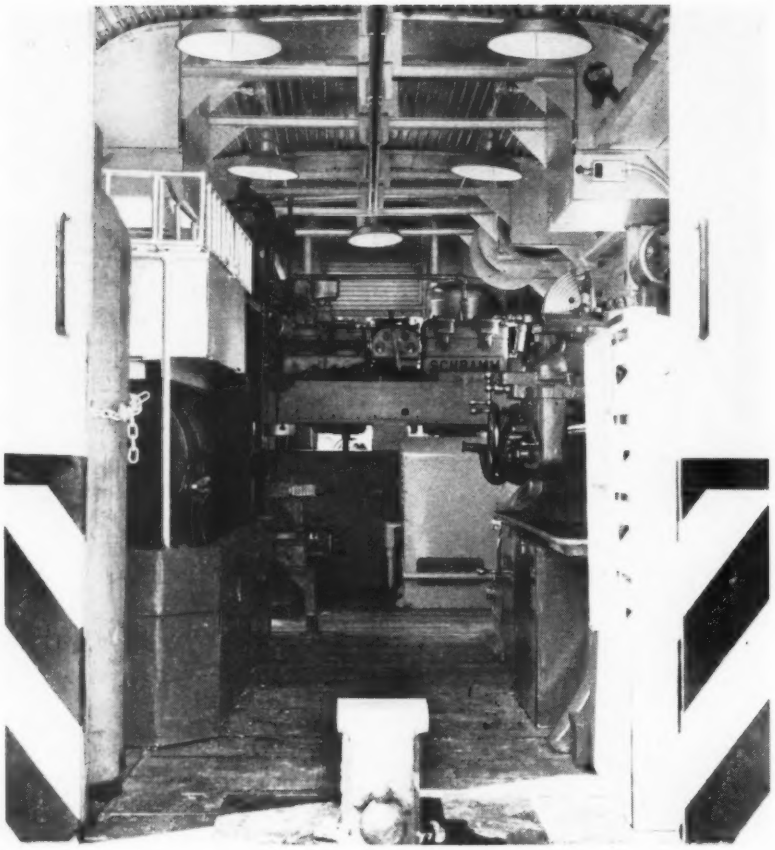
[There are obviously important differences in the problems involved in maintaining and repairing highway bridges on the one hand and railroad structures on the other. But at the same time there are sufficient similarities to suggest that occasionally an idea developed by the highway people may be adaptable to railroad work, or vice versa. It is with this thought in mind that we present this description of mobile repair outfits in use by a state highway department. Perhaps some of our readers will find that the idea, with appropriate changes in the equipment, can be adapted for use in dealing with their own structural maintenance and repair problems.—Editor]

● An example of the use of mobile, highly-mechanized equipment for doing structural maintenance and repair work at widely scattered locations over a large area is afforded by the experience of the Florida State Road Department with three completely-equipped outfits mounted on rubber tires. These units, all incorporating similar equipment, are especially designed for making heavy bridge repairs. In Florida they have not only been found effective in helping to restore damaged highway bridges to service quickly, but their use is making it possible to do such work more economically than was possible by methods and equipment formerly in use.

A factor in leading to the development of these mobile outfits in the State of Florida is the unusually large number of important highway bridges that must be maintained. These include innumerable drawbridges across coastal inlets and long structures across bays and other large bodies of water. The latter type includes a seven-mile long bridge that was formerly a part of the Overseas Extension of the Florida East Coast line to Key West, which has now been converted to highway use.

Each of the mobile outfits consists of a highly-mechanized machine shop, a transport trailer-truck, a crane truck, a house trailer, and a station wagon. Much of the work of building and outfitting them has been done in the road department's shops at Orlando, Fla., where a fourth unit is now under construction. The cost of one of the outfits is about $35,000.

The personnel of each unit consists of a superintendent, a ma-



Looking through rear door of one of the mobile machine shops. The tools and equipment incorporated in each shop are as follows:

Lathe: South Bend; 16 or 24-in. on 6-in. bed; driven by 2-hp., 220-v. motor; with milling and grinding attachments.

Drill Press: Canedy-Otto; 21-in. stationary head, upright; electric-driven.

Hack Saw: Miller-Knuth; 6-in. stroke; electric-driven.

Welder: P&H; 300-amp; gasoline-driven.

Compressor: Schramm; 105-c.f.m.; gasoline-driven.

Generator: Bohler; 5-kvv, 220- or 120-v; gasoline-driven.

Grinder: Black & Decker; 10-in. bench-type; electric.

Hoist: Yale, 1-ton; on overhead trolley.

Jackhammer: Sullivan; with sheet driving head.

Rock Drill: Sullivan; Timken bits.

Drills: Black & Decker (3); 1/4, 3/8, and 3/4-in.; electric, Thor; 1 1/4-in.; air-driven.

Grinders: Skilsaw; electric. Thor; air-driven.

Saw: Skilsaw; heavy-duty; electric.

Flame Burner: Oxweld CM-16; electric-driven.

Miscellaneous: Two Blackhawk 50-ton hydraulic jacks; Smith heavy-duty oxygen and acetylene burning and welding equipment; Little Giant combination screw plate set and bolt threader (1/4 to 1-in., USS and SAE); 6-in. machinist vise; four CPA triple scalers; full assortment of hand tools and supplies; 30-ft. aluminum extension ladder.

chinist, a welder, a burner and a steel erector. Additional labor is required on nearly every job, but this is recruited locally from the regular road maintenance forces. The lead car of the caravan is a Chevrolet station or suburban wagon, seating seven, which transports the permanent crew to and from the jobs, and also pulls the house trailer in which this crew is lodged while engaged on a repair job. These trailers are purchased from the Nappanee Trailer Company, Nappanee, Ind., but the bunks and other equipment are installed in the Orlando shops.

The transport trailer-truck is used for hauling and placing heavy material, and has proved of particular value for handling the Bailey units used on the construction of temporary bridges. It consists of a 5-ton FWD truck, pulling a 25-ton LaCrosse trailer. The tractor is equipped with a 3-ton crane and the subframe carries a Garwood Rapid-Reverse winch of 30,000 lb. capacity, having 400 ft. of ¾-in. wire rope on the drum.

The crane truck, intended for lighter loads, is fitted with a two-ton crane and also has a 15,000-lb. winch, a skid-mounted P.&H. 300-amp. welding machine, Smith cutting and welding equipment, two 50-ton Blackhawk hydraulic jacks with gages, miscellaneous rigging, and hand tools. This unit has proved particularly useful for setting piling and timbers.

Fully-Equipped Machine Shop

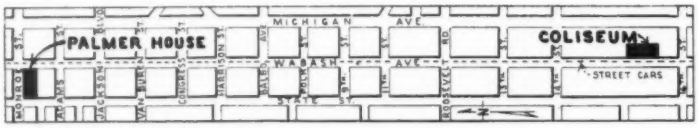
The mobile machine shop, pulled by a heavy tractor, is housed in a van-type body, built in the Orlando shops, which is carried on a low-bed LaCrosse trailer. It has eight openings each of which is fitted with an overhead garage-type rolling door. Equipment and tools contained in the machine shop are listed with the photograph showing the interior of this unit. All this equipment has been included in the shop while allowing sufficient space for workmen to move about. The machinists' vise is mounted on the rear frame and extends beyond the end of the truck, so that pieces longer than the truck body may be handled. A full assortment of hand tools and supplies is also carried in the shop.

The accompanying photograph of the complete mobile unit shows an emergency electric unit as part of the fleet. Such units are not a standard part of the maintenance caravan, but are found to be valuable in operating movable spans, in case of power failures, which are a frequent occurrence during the hurricane season.

The units are in charge of E. C. DeGarmo, engineer maintenance of way, State Road Department, Orlando, Fla., who has had a major part in their planning, development and refinement. They are used for the maintenance of all steel superstructures and for the repair and replacement of machinery on movable spans. The jobs done with this equipment have included the replacing of main trunnion bearings and shafts; the making and installing of tracks for crawler-type bascule spans; the setting and welding of open-steel grid decks; and the erecting of Bailey bridges for detours.

An unusual job was the repair of an overpass that was badly damaged as a result of a freight-train collision at the crossing of two railways at grade immediately under it. Despite excessive damage, emergency repairs were effected by one of the caravans within three weeks.

The crane trucks (above) each consist of a two-ton truck equipped with an extension rear axle. Fittings for the truck include a two-ton capacity crane and a 15,000 lb. capacity winch complete with 400 ft. of ½-in. heavy wire rope. On the right is shown the mobile bridge-repair unit at the location of a typical job—the renewal of the decking on a highway bridge. The mobility of the unit affords the advantage of having the machine shop as close as possible to the job, and over a period of time, can result in a considerable time saving. Each machine shop unit (below) consists of a van type body enclosing the shop equipment, mounted on a low-bed semi-trailer which is drawn by a heavy-duty tractor when in transit. Openings are provided in the end and sides of the van to facilitate the handling of materials and machinery in and out of the machine shop, in addition to affording excellent ventilation. These openings are fitted with garage-type overhead doors which may be easily opened and closed



Don't Miss the NRAA EXHIBIT

WHERE: Coliseum, 1513 South Wabash avenue.

WHEN: Monday—9:00 a.m. to 6:00 p.m.; Tuesday—9:00 a.m. to 6:00 p.m.; Wednesday—9:00 a.m. to 6:00 p.m.; Thursday—9:00 a.m. to 3:00 p.m.

HOW TO GET THERE: By street cars (fare 17 cents) marked *Indiana* or *Cottage Grove* going south on Wabash. Board cars at Monroe and Wabash, get off in front of Coliseum.

ADMISSION: By railroad employee pass or free pass obtainable at A.R.E.A. registration desk at the Palmer House.

All available display space in the Coliseum—267 booths—reserved by 119 companies to show their products during A.R.E.A. annual convention

• A mammoth equipment "show" awaits all railway men who can get to Chicago, March 10-13, inclusive. Presented by the National Railway Appliances Association especially for the benefit of the men attending the convention of the American Railway Engineering Association on Tuesday, Wednesday and Thursday of that week, this exhibit covers a greater area than any other since the N.R.A.A. ceased to include signaling appliances displayed for the members of the Signal Section, Association of American Railroads, which formerly met concurrently with the A.R.E.A.

Today, with more and more materials, devices and equipment being designed and built for economically constructing and maintaining railway tracks and structures, a greater number of manufacturers reserved multiple booths to display their products. A major factor in this change has been the increased size of many of the individual units of equipment, both on and off-track types, developed in recent years. These large machines make the present exhibit a study in contrasts—for in one group of booths may be displayed a gargantuan grading machine, in another a colossal on-track tamping outfit, while nearby may repose a number of small, seemingly insignificant but even more ubiquitous lock washers.

This interesting and capacity exhibit, the first held by the N.R.A.A. since 1949, is being directed by its officers, H. M. McFarlane (Cullen-Friestedt Company), president; Jess Mossgrove (Baldwin-Lima-Hamilton Corporation), vice-president; R. A. Carr (Dearborn Chemical Company), secretary; W. H. Tudor (International Harvester Company), treasurer; and Lewis Thomas (Q & C Co.), assistant secretary. Mr. Thomas also acted as director of exhibits.

A list of the companies participating in the event, with their booth numbers, the products to be displayed and the representatives who expect to be on hand, is presented here, together with a floor plan showing the exhibit spaces.

List of Exhibitors

Products marked with an asterisk have never been exhibited before

Achuff Railway Supply Company, St. Louis, Mo.—Space 14—Rail anchors; track pads; heavy-duty spring washers. G. W. Achuff, A. L. Bartlett, H. G. Rowe, A. Milton Wells.

Air Reduction Sales Company, New York—Space 22S—Radiagraph flame cutting machine*; machine for flame hardening rail ends; flame-cleaning torches; tips; regulators hardfacing alloys. D. E. Dallman, J. W. Kenefic, L. C. McDowell, U. F. Portell, R. L. Rex, W. P. Rodgers, D. J. Williams.

N. R. A. A.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.—Space 9N-10N-11N-12N—Diesel-powered crawler tractor with 1-cu. yd. hydraulic front-end shovel; diesel crawler tractor with bulldozer; industrial wheel tractor with mower. R. F. Garity, G. P. Molzahn, D. D. Kennedy.

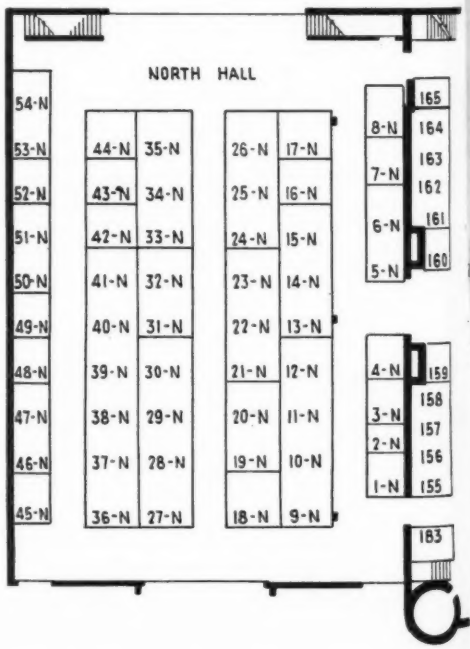
American Brake Shoe Company, Ramapo Ajax Division, Chicago—Space 37-38-39-40-41—Tie-plate anchor studs; switch stands; rail lubricators; guard-rail tie plates; integral-base crossing; vertical switch rods; switch points, stock rails and fittings; rail braces; switch-point lock. R. A. Burt, O. Bengston, G. A. Carlson, C. P. Corrigan, E. E. Dailey, R. M. Evans, C. E. Godfrey, H. Hazelton, Jr., A. F. Hess, D. F. Holton, B. Howard, Jr., A. F. Huber, K. D. Hughes, J. S. Hutchins, J. V. Houston, G. J. Killmer, J. P. Kleinkort, O. F. Magnus, L. I. Martin, W. A. Maxwell, R. L. McAbee, J. McComb, W. C. Muller, E. F. Needham, E. Pohling.

American Hoist & Derrick Co., St. Paul, Minn.—Space 115-116—Illuminated transparencies showing diesel-electric locomotive cranes, crawler cranes and truck-mounted cranes; working scale-model of diesel-electric locomotive crane. Harold B. Brooke, Steve C. Brown, John E. Carroll, George Cooper, Lee E. Coulter, George Dallas, Clarence Gush, Stanley M. Hunter, Edward Kopper, E. L. McCabe, E. S. McCormick, Norman Olsen, Charles F. Palmer, Ralph W. Payne, Stanley H. Smith, John Samson, L. W. Whittaker, Conroy W. Wilson.

American Lumber & Treating Co., Chicago—Space 4—Samples of clean-treated lumber; samples of fire-retardant treated lumber; photos of typical installations of treated lumber. H. W. Angell, B. A. Burnside, R. R. Clegg, R. T. Pierce, R. B. Putman.

American Railroad Curvelining Division of R. K. Price Associates Inc., New York—Space 176A—Curvelining calculator. R. A. Fichter.

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Space 26-27—Multiple-plate pipe with sheeting headwall*; perforated pipe; spiral-welded pipe; asbestos-bonded culvert pipe; tunnel liner plates; bin-type retaining wall; steel buildings. C. H. Anderson, G. R. Betts, F. S. Bolton, E. L. Campbell, Herbert Clarke Jr., H. S. Claybaugh, C. M. Colvin, E. T. Cross, V. W. Davis, J. D. Faylor, C. L.



Presents Large Exhibit

Fisher, J. R. Hursh, W. P. Lipscomb, N. A. Powell, W. H. Spindler, R. N. Tracy, F. W. Truss.

Baldwin-Lima-Hamilton Corporation, Philadelphia, Pa.—Space 87—Air-operated dump-car model and photographs. A. N. Clark, Jr., C. G. Green, T. F. Kearney, Jess Mossgrove, L. P. Thomas.

Barco Manufacturing Company, Chicago—Space 25—Gasoline-operated tie tampers; gasoline-operated hammers and drills; gasoline-operated earth compactors; magnesium-alloy tank-car unloading arrangement; magnesium-alloy diesel-fueling arrangement; flexible ball joints. J. E. Coquillard, C. O. Jenista, W. T. Jones, L. J. Lytle, J. L. McLean, C. L. Mellor.

Bernuth, Lembcke Co., Inc., New York—Space 22—Tie-plate lock spikes; tie-plate anchor spikes. A. C. Jack.

Binks Manufacturing Company, Chicago—Space 17N—Complete line of heavy-materials pumps; pump for 5-gal. can; 5-gal. heavy-materials pressure tank; 5-gal. tank for spray painting; and 10-gal. tank for spray painting; spray guns with different sizes of nozzles for heavy materials; paint-spray guns; 4-ft. extension gun with nozzles for heavy materials; caulking gun; 6-ft. extension gun for painting; gasoline-engine-driven portable air compressor mounted on four rubber wheels; various spraying accessories. Wm. Brooks, Thos. Burns, Geo Cook, V. G. Green, P. L. Griffin, E. Gustafsson, Geo Harker, Earle A. Mann, Robert E. Mann, Karl W. Osterstrom, Burke Roche, Wm. Roche, E. F. Watts.

Bird & Son, Inc., East Walpole, Mass—Space 24N-25N-26N—Tie pads; ties and tie sections protected by tie pads; historical tie-plate exhibit. John Crowe, John Dooling, H. L. Holderman, F. P. Reynolds.

Blaw-Knox Division, Blaw-Knox Company, Pittsburgh, Pa.—Space 44N—Steel open-mesh grating; samples of grating used in highway grade crossings, as freight-car running boards and as passenger-car step plates; scale model of highway crossing paved with open-mesh grating; illuminated color transparencies of various other products. S. W. Bevins, T. F. Carlin, James Mayer, N. I. Mekeel, Jr., George M. Milliken Jr., J. W. Moore, Harold S. Russell, Robert S. Russell, Paul F. Vollmer, Carl F. Weiblin, Robert J. Wylie.

The R. H. Bogle Company, Alexandria, Va.—Space 45N—Chemical weed-killing service; chemical brush-killing service; photographs and literature on dual-spray equipment*. J. B. Bogle, R. H. Bogle, R. H. Bogle, Jr., W. C. Parrish, Jr., R. E. Stuart.

Bowser, Inc., Fort Wayne, Ind.—Space 1S—Oil-flow meters; dehydrator for separating water from diesel fuel; greatly enlarged photo showing typical lube-oil dispensing system; expendable-cartridge filter for diesel fuel; enlarged photograph showing one-package fueling system. I. D. Bone, T. P. Davidson, C. J. Egger, F. S. Ehrman, B. W. Grosvenor, O. G. Mahnensmith, H. B. Thoresen, C. G. Wendelin.

Branson Instruments, Inc., Stamford, Conn.—Space 178A—Rail-flaw detector. Peter K. Bloch.

Briggs & Stratton Corp., Milwaukee, Wis.—Space 2S—Five models of single cylinder, air-cooled, 4-cycle, gasoline engines. H. S. Brown, J. H. Ebershoff. F. R. Maloney, E. V. Oehler, J. J. Stephens, F. P. Stratton, W. B. Van Vleet.

The Buda Company, Harvey, Ill.—Space 42-62—Power track drills*; bonding drill*; hydraulic jacks*; fork-lift truck*; jack-type rail bender, track liner, track jacks, hand track drill. Ed Broholm, H. H. Cohenour, L. C. Daniels, R. M. Dickinson, C. Leetz, R. J. Mulroney, J. Reichert. H. E. Roth, Ray Scott, Jr., Roy P. Williamson.

Caterpillar Tractor Company, Peoria, Ill.—Space 77-78-79-80-97-98-99-100—Small tractor and excavator-loader*; off-track shoulder ballast cleaner* made by allied manufacturer; large tractor equipped with crane boom and dragline. Gale Allen, Herb Cadmus, G. P. Fenn, J. E. Fleming, R. A. Fletcher, J. J. Irwin, R. H. Lewis, A. T. Marchuk, E. C. McAllister, N. M. Nelson, Ralph Patten, F. E. Schaumburg, T. V. Shea, R. E. Stiegele.

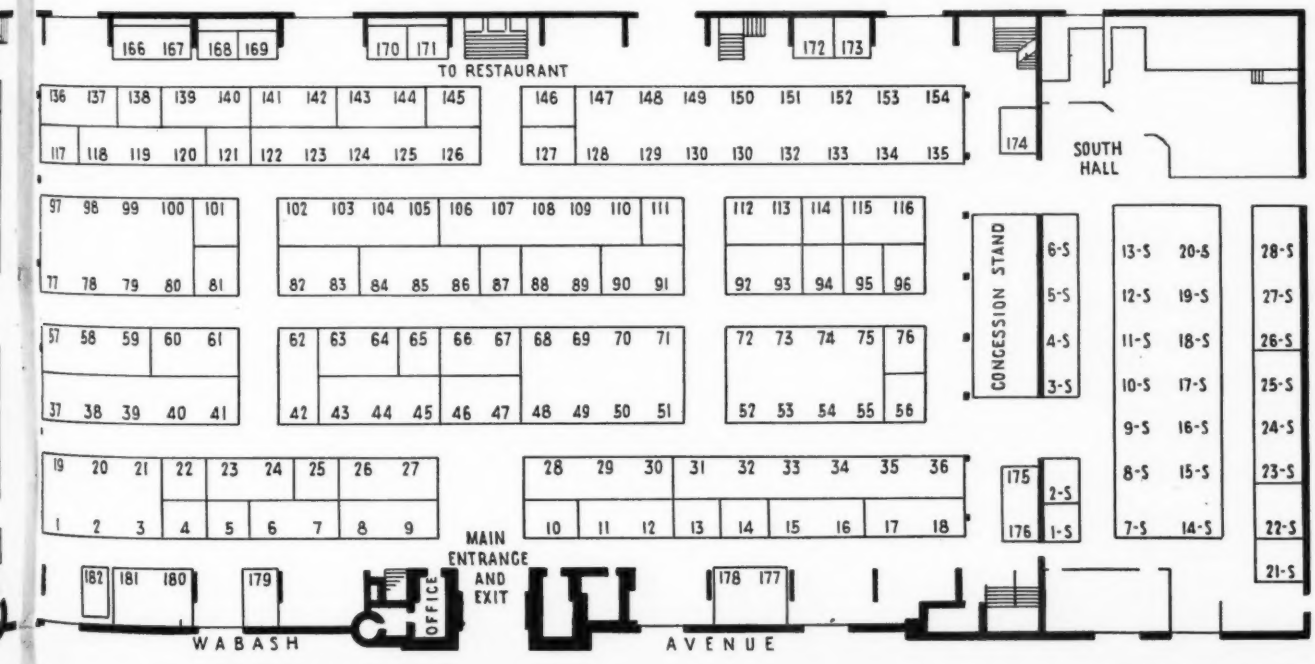
Chicago Pneumatic Tool Company, New York—Space 63—Air compressors; gasoline unit tampers; pneumatic tampers; spike drivers; drills; wood borers; impact wrenches; grinders; electric tools; speed recorders. J. J. Brown, C. L. Butler, G. J. Coffey, S. A. Congdon, H. R. Deubel. T. P. Harris, J. E. Hopping, C. D. Nicholls, Wm. Pallowick, E. S. Rosselle.

H. M. McFarlane
President
National Railway Appliances Association

Chipman Chemical Co., Inc., Bound Brook, N. J.—Space 23-24—Weed-and-brush killing chemicals; complete application service; deicing greases and liquids. R. B. Coleman, L. E. Harris, C. S. Langdon, W. H. Moyer, R. W. Rake, A. J. Reading, F. J. Seibert, Jr., M. B. Williams, D. A. Zanette.

Cullen-Friestedt Company, Chicago—Space 66-67—Miniature model of 12-ton crane with a 55-ft. boom; pictures and photographs of other models of cranes. R. H. Bell, R. E. Bell, K. J. Beller, L. B. Bertaux, C. J. Bronez, Max Chudleigh, E. V. Cullen, F. J. Cullen, F. P. Cullen, C. G. Edwards, T. G. Frazee, W. D. Hoffman, H. M. McFarlane, E. F. Poe, T. H. Preisker, G. G. Prest, J. E. Simkins, C. R. Turner.

Dearborn Chemical Company, Chicago—Space 43-44-45—Pictorial display of rust-preventive applications on rail joints, track fastenings, rail in tunnels, rail through station plat-



forms, road crossings, bridges and turntables; waterproofing of concrete and steel bridge decks, abutments and piers; underground protection for pipe. D. B. Bishop, R. A. Carr, E. P. Fager, L. E. Flinn, H. E. Johnston, F. H. Kuhlmann, D. D. Powers, C. C. Rausch.

Dow Chemical Co., Midland, Mich.—Space 3N—Brush-killing chemical, grass-killing chemical, weed-killing chemical and pentachlorophenol wood preservative. J. C. Cravens, E. C. Earley, William Melching, George Olson, William F. Richards, James Secor, Hillard Smith.

Duff-Norton Manufacturing Company, Pittsburgh, Pa.—Space 112-113—Track jack; bridge jack; car jack; locomotive jacks; aluminum track jack. C. R. Ellicott, D. F. Evans, W. I. Floyd, J. Gilchrist, Jr., E. C. Gunther, T. C. Hammer, T. W. Krueger, J. F. McCartney, N. A. Sinclair.

Eaton Manufacturing Company, Reliance Division, Massillon, Ohio—Space 82-83—Spring washers; improved spring washers for frogs and crossings*. E. C. Caruthers, E. D. Cowlin, S. E. Cowlin, C. A. Esinhart, R. F. Golden, E. C. Gross, Sr., E. C. Gross, Jr., F. K. Howell, R. B. Little, A. H. Weston.

Electric Tamper & Equipment Co., Ludington, Mich.—Space 106-107-108-109-110—Improved model of multiple tamper; hydraulically actuated device for moving tamper from tie to tie*; hydraulic set-off lift*; vibratory tamper with power plant; tamping blades; and new power plant*. Robert L. Banks, W. T. Bloomfield, H. W. Cutshall, A. W. Davis, George L. Glover, M. D. Hall, Glen H. Haywood, James F. Hensel, Raymond F. Hermann, A. B. Holt, C. Jackson, Carlton Keen, Robert J. Lawton, James T. Lydon, L. S. Osborn, Hugh D. Piper, James W. Prewitt, Edward E. Scott, James M. Straban, M. S. Westlund.

Evans Products Company, Plymouth, Mich.—Space 53N-54N—Box-car load-securing device. H. E. Cooper, E. W. Peterson, W. L. Thomas, R. K. Tobin, W. G. Webb.

Fabreeka Products Company, Boston, Mass.—Space 139-140—Samples; installation photographs of composition materials used to absorb vibration and shock in bridges, turntables, crossings, tunnels, and scales; tie pads for reducing mechanical wear of ties. D. J. Calder, F. A. Hofmann, R. R. Howard, S. S. Maurer, A. W. McKaig, R. L. Murphy, W. B. Rogers, Jr., F. B. Summers, Jr.

Fairbanks, Morse & Co., Chicago—Space 48-49-50-51-68-69-70-71—Motor cars; motor-car wheels; pumps; electric generating sets; scales; electric motors; portable hand lamps; illustrations of diesel locomotives. W. F. Anderson, P. J. Anthony, E. L. Benson, O. H. Brauer, E. P. Chase, J. A. Cuneo, L. L. Farris, E. C. Golladay, C. O. Gwinn, W. Herzig, C. J. Helmholtz, H. L. Hilleary, D. Hopkins, J. S. King, C. S. Konzelmann, R. F. Lane, O. O. Lewis, J. F. Marquitz, R. H. Morse, Jr., C. B. O'Neil, V. H. Peterson, J. J. Poirier, P. S. Proctor, C. A. Rauch, B. H. Roberts, N. A. Sproesser, W. H. Turner, C. Van Natta, P. S. York.

Fairmont Railway Motors, Inc., Fairmont, Minn. — Space 128-129-130-131-132-133-134-135-147-148-149-150-151-152-153-154—Inspection, section and extra-gang motor cars; tie sprayer; highway-railway motor car; oil-spray car; motor-car accessories; tie remover; tie inserter; tie nipper*; spike puller*; rail lifter*; ballast maintenance car. G. F. Adams, O. F. Banke, W. A. Banke, C. P. Benning, C. W. Brhel, W. D. Brooks, O. F. Buscho, K. K. Cavins, C. J. Dammann, D. E. Doolittle, D. L. Duffin, M. Ellenbecker, I. N. Eustis, R. B. Evans, J. S. Furse, Tracy Horn, C. H. Johnson, F. W. Kasper, J. G. Kasper, W. F. Kasper, F. A. Kaup, R. H. McCune, N. J. McDonald, G. E. Neffeler, C. L. Rager, W. H. Ripken, Fred Rose, F. G. Simmons, H. A. Sly, N. W. Stenzel, Ira Sublet, H. W. Templeton, R. G. Wade, W. M. Williamson.

Gary Slag Corporation, Chicago—Space 18N—Crushed-slag ballast. J. Edward Campbell, Lauren Chapman, R. Newton McDowell, Mrs. Donna Mills.

General Chemical Division of Allied Chemical & Dye Corporation, New York—Space 179—Two special weed killers; emulsible weed-oil; 2,4-D and 2,4,5-T brush killer, 2,4-D amine weed-killer additive; 2,4-D ester oil-soluble additive; sodium salt of trichloroacetic acid, liquid concentrate; sodium salt of trichloroacetic acid, 90 per cent dry powder; motion picture showing weed-control spray train in operation. R. N. Chipman, A. M. Dean, A. O. Feigin, M. E. Ingalls.

The Brice Hayes Company, Chicago—Space 21S—Dumping units for push cars or trucks; spike locks; fence anchors; telescopes for lining and surfacing track*. A. F. Collins, B. Goryn, Brice Hayes, R. Skanse.

Hayes Track Appliance Company, Richmond, Ind.—Space 146—Cushion wheel stop; sliding derail; operating stand; photographs and literature of new and improved bumping posts. S. W. Hayes, Winchell C. Hayes, Herbert J. Mayer, P. C. McClure, D. E. Runnels, W. K. Simpson.

Homelite Corporation, Port Chester, N. Y.—Space 177-178—Gasoline-engine-driven generators; gasoline-engine-driven, self-priming centrifugal pumps; one-man, high-cycle electric chain saws; gasoline-engine-driven chain saws; floodlights and high-cycle electric tools, including impact wrenches, grinders, concrete vibrators, circular saws and nut runners; dual-purpose high-cycle generator*. Kenneth J. Clapp, T. W. Gramm, L. Niemiec, Nelson Thompson.

Hubbard & Company, Tool Division, Pittsburgh, Pa.—Space 145—Spring washers; rail anchors; track tools. A. L. Fridley, J. H. Hines, N. A. Howell, A. C. Laessig.

Industrial Brownhoist Corporation, Chicago—Space 94—Motion pictures of 250-ton diesel wrecking crane; diesel-electric locomotive crane; ballast cleaners; other products. A. P. Lyvers, W. W. Mossgrove, M. A. Norby, Max Riebenack, III.

Ingersoll-Rand Company, New York—Space 28-29-30—Tie-tamping compressors in various sizes, including a 36 c.f.m. spot tamper; two sizes of pneumatic tie tampers; air and electric impact tools; spike drivers; paving breakers; jackhammers; wood borers; chipping hammers; riveting hammers; grinders and other air tools. R. Baldwin, G. Brahler, J. Crocker, L. H. Geyer, E. L. Hawse, L. Luther, R. Sampson, R. E. Terry, G. Williams.

Insley Manufacturing Corporation, Indianapolis, Ind.—Space 27N-28N-29N-30N—Tenton crane on rubber-mounted carrier. R. J. Boatman.

International Harvester Company, Chicago—Space 52-53-54-55-72-73-74-75—Diesel crawler tractor with bulldozer; diesel crawler tractor with overhead loader; diesel crawler with skid loader; wheel tractor with mower and bucket loader; hand-controlled working model of skid loader* on tractor. F. Van Allen, E. A. Braker, Roy Dockery, Art DuBois, W. H. Kuhlman, R. C. Larkin, Richard Lyons, J. R. Roberts, Donovan Stevens, W. H. Tudor, John Rifel, L. W. Warfel.

Jackson Vibrators, Inc., Ludington, Mich.—Space 21N-22N-23N—Vibratory device* for compacting asphalt crossings and platforms and for consolidating soils; trailer-mounted power plant. A. W. Davis, Morgan D. Hall, Edward E. Scott, James M. Strahan.

The Jaeger Machine Company, Columbus, Ohio—Space 141-142—Two sizes of portable air compressors; concrete mixer; and several models of self-priming centrifugal pumps. J. D. Anderson, H. A. Kindler, Dale Murray, W. L. Wolfe.

Johns-Manville Sales Corporation, New York — Space 155-156-157-158 — Asbestos-cement pipe; asbestos wallboards; ready-to-lay roofings; asbestos shingles for roofing and siding; flooring; corrugated asbestos-cement sheets. C. E. Bryant, Jr., G. J. Campbell, S. M. Eaton, Fred Fix, S. H. Flannagan, G. R. Frankland, J. R. Freal, W. S. Hough, J. D. Johnson, H. G. Palmer, C. M. Patten, A. C. Pickett, D. G. Porter, W. W. Prosser, R. P. Townsend, F. C. Vandervort.

O. F. Jordan Company, East Chicago, Ind.—Space 81—Model of heavy-duty spreader-ditcher-snow plow which will be fully operative by means of compressed air to simulate actual operation. James P. Bowers, John J. Dee, Alford Earley, L. J. Emmerling, J. C. Forbes, W. B. Joyce, Walter J. Riley, William J. Riley, C. W. Shipley, A. H. Witzke.

The Joyce-Cridland Company, Dayton, Ohio—Space 117—Aluminum-alloy track jacks; aluminum-alloy journal jacks; malleable-iron track jacks; malleable-iron journal jacks; air-motor jacks; automatic-lowering jacks; hydraulic jacks; locomotive screw jacks; standard-speed, ball-bearing screw jacks. Walter Powers, Huston Brown, John M. Miller, Dave Stockman, C. N. Thulin.

Kalamazoo Manufacturing Company, Kalamazoo, Mich.—Space 57-58-59—Extra-gang motor car*; inspection motor car*; material expediter*; material-handling truck; track gages and levels; demountable motor-car wheels; differential axles. L. Boswell, Stan Haigh, Geo. W. Hoover, Joe Kearney, R. E. Keller, Thomas Mabry, Thomas Mabry, Jr., George E. Monroe, T. C. Johnson, M. J. Orton, Roger Peckinpaugh, P. E. Pettes, Walter Pfeiffer, H. A. Robandt, Lloyd O. Stratton, J. H. Tuttle, Henry A. Vogel, O. W. Youngquist.

H. T. Kennedy Company, Inc., New York—Space 48N—Spike anchors; rail and flange lubricator; jaw-and-key rail fastening. H. T. Armstrong, G. W. Grady, H. T. Kennedy, R. B. Swan.

Kershaw Manufacturing Company, Inc., Montgomery, Ala.—Space 26S-27S-28S—Ballast regulator and scarifier*; ballast plow and distributor; 40-in. wheel-type cribber; utility derrick, 2500-lb. capacity; two-ton rail derrick. R. H. Bigelow, Jeff W. Davis, Dave W. Hallberg, Carroll G. Holloway, Royce Kershaw, J. B. Lawrence, Adrian del Paso, Jr., Vincent Shivers, H. H. Williams.

Koehring Company, Milwaukee, Wis.—Space 102-103-104-105—Shovel; crane with propulsion car; power wheelbarrow; clamshell bucket; photographic enlargements of equipment in action. R. E. Bansemer, J. S. Conway, J. E. Chadwick, Arthur Cossens, E. J. Goes, A. E. Kelbe, J. A. Miller, J. R. Steelman.

The Lehon Company, Chicago—Space 95—Colorless liquid for preserving and water-proofing wood*; liquid for waterproofing masonry*; asphalt roll roofing and shingles; cold-process roofing; hot built-up asphalt roofs; waterproof felts; fabrics and papers; asphalt roof coatings; aluminum paint. T. L. Connolly, J. E. Eipper, E. A. Leonard, J. W. Shoop, H. A. Wolfe.

LeRoi Company, Milwaukee, Wis.—Space 180-181—Self-propelled, 105-c.f.m. tractor-mounted compressor with back-hoe attachment. R. E. Bell, R. H. Bell, J. H. Callahan, George M. Dallas, J. T. Flynn, K. E. Gifford, J. E. Heuser, George M. Hogan, Donald J. Hogan, John E. Hogan, Wm. D. Hoffman, Glen C. Hunt, Leon E. Hunt, F. E. McGee, C. L. Meigs, R. R. Morgan, J. M. Norton, N. W. Reinker, D. N. Roddy, R. E. Schatmeyer, G. Scrivner, N. M. Sedgwick, S. H. Smith, L. O. Stratton, R. H. Watkins.

R. G. LeTourneau, Inc., Peoria, Ill.—Space 36N-37N-38N-39N-40N-41N—Rubber-tired bulldozer; scraper unit with bulldozer blade. Danny Burke, Henry Cain, Steve Czerwinski, Russ Dickerson, Fran Duke, R. P. Nichols, H. R. Powers, Lloyd Rager, Wendell Richards, Joe Serkowich, George Summers, George Wacker.

The Locomotive Finished Material Company, Atchison, Kan.—Space 4N—Models of alloy-steel, one-piece frogs and other rail-maintenance items. Norman E. Gillespie, R. L. McIntosh, A. H. Moorhead, T. A. Moorhead, G. W. Taylor.

The Lufkin Rule Company, Saginaw, Mich.—Space 127—Comprehensive line of measuring tapes, rules and precision tools, including chrome-clad steel tapes. R. M. Benjamin, Alfred Hillert, Richard Lone, Geo. T. Schlitt, R. T. Young, T. P. Young.

Maintenance Equipment Company, Chicago—Space 84-85-86—Power rail layer; setoff and transfer for rail layer; single-rail, rail & flange lubricator; reversible switch-point protector applied to rail; and enlarged photographs of single-rail lubricator in track, double-rail, yard-type-lubricator in track, switch-point protector attached to rail, large yard equipped with switch point protector, and power rail layer. E. H. Amond, E. M. Gerulat, A. Gleeson, L. C. Hummel, E. Overnier, B. C. Sasules, H. V. West, Jr., P. J. Wolf, D. J. Zick.

Mall Tool Company, Chicago—Space 11-12—Electric, pneumatic and gasoline-engine chain saws; improved $8^1/_4$-hp. combination rail grinder; 2-hp. rail grinder; rail-grinder attachments; concrete vibrators; circular saws; electric drills; electric impact wrenches; electric hand chain saws*. J. Beven, G. Hans, R. May, H. Strehlow, W. Warner.

Masonry Resurfacing & Construction Co., Inc., Curtis Bay, Md.—Space 2N—Models illustrating the various steps in special system of pile repair; photographs of repair work; literature. I. Leon Glassgold, S. S. Glassgold.

Massey Concrete Products Company, Chicago—Space 172—Foss Clarke, J. A. Higgs, Joe K. Lynch, W. Lyle McDaniel, G. H. Redding.

The Master Builders Company, Cleveland, Ohio — Space 175-176 — Cement-dispersing agent; non-shrinking metallic grout mixture; metallic-aggregate surface hardener for use as a wearing surface on concrete; an asphalt-like compound* containing ground-iron particles for

quick patching and resurfacing of warehouse floors and sheltered platforms; a ground-iron compound* used to plug worn spike holes in ties when regaging or respiking. V. S. Andrews, C. H. Borcherding, J. Fellabaum, W. P. Geiser, F. R. Hinds, A. S. Holway, W. Jaros, R. Laut, C. A. Lyon, R. T. Peck, A. P. Seyler, B. R. Wood.

The Matisa Equipment Corporation, Chicago—Space 19N-20N—Automatic tamping machine; pictures of tamper, ballast cleaner, and auxiliary track equipment*. R. A. Baer, L. Cuny-Ravet, S. P. Murphy, W. C. Runnstrom.

McCulloch Motors Corporation, Los Angeles, Cal.—Space 166-167—Three models of gasoline-powered chain saws; portable earth drill; portable pump. F. A. McGonigle, G. Langford, D. E. Soderberg.

Mead Specialties Company, Chicago—Space 169—Baby Bulldozer and accessories, including hammer-knife mower, generator for hand tools, rotary broom, front-end loader. Lewis Dimick, H. O. Henwood, R. E. Malek, F. I. Mooney, Harry Moorman.

Mid-West Forging & Manufacturing Co., Chicago—Space 183—Rail anchors. Noble Gibson, J. L. Hench, Ray T. Johnson, Russell Robertson, J. R. Wilson.

Modern Railroads Company, Chicago—Space 174—Copies of Publication. Charles W. Behrens, David A. Glenn, Roy Gurley, Floyd C. Leverette, E. C. Myers, L. E. Parkhurst, Val G. Rice, Frank Richter, John M. Sitton, David R. Watson.

Morrison Railway Supply Corporation, Buffalo, N. Y.—Space 3—Steel-grating highway crossing. J. P. Best, J. M. Fair, R. Newman, E. W. Smith, D. R. Vogel, B. J. Yelin.

Motorola, Inc., Chicago—Space 1N—Hand-portable 2-way radiophones; mobile units; railroad radio units; fixed station radio units. Ralph Anderson, Floyd McCall.

The Murdock Manufacturing & Supply Co., Cincinnati, Ohio—Space 8N—Water-service devices; drinking fountains; air valves; check valves; diesel-watering hydrant; hose-coupling guards; car wash boxes; street washers. J. H. Ferguson, G. B. Lawrence, J. Kelso Murdock, John McKechnie, D. B. Totten, John Vogler.

National Aluminate Corporation, Chicago—Space 161-162-163-164—Literature on water and fuel-oil treatments; weed-control chemicals and service. C. M. Bardwell, B. D. Barger, R. G. Bielenberg, C. A. Brown, J. L. Callahan, J. B. Cowie, P. D. Dempsey, P. W. Evans, F. M. Gaughan, J. L. Gibboney, R. J. Harrison, L. S. Heasom, R. V. Lucas, L. L. Lux, H. A. Marshall, F. C. McKenna, E. M. Miller, D. A. Rieser, T. D. Sedwick, H. D. Shaw, C. E. Winchell, R. V. Zahm.

National Lock Washer Company, Newark, N. J.—Space 92-93—Spring Washers. M. W. Allen, T. C. Coleman, Jr., D. W. Hallberg, Eugene Harbeck, G. G. Prest, R. S. Stephens, Jr., Gilbert E. Webster.

The Nichols Engineering Company, Chicago—Space 121—Photographs of crossover bridges for l.c.l. stations, fuel-oil unloading stations, and upper-level working platforms for diesel-repair shops. B. F. Goldman, S. H. Nichols.

Nordberg Manufacturing Company, Milwaukee, Wis.—Space 7S-8S-9S-10S-11S-12S-13S-14S-15S-16S-17S-18S-19S-20S—Rail drill; cribbing machine; ballast excavator and cleaner; spike puller; power jack; spike hammer; power wrench; gaging machine*; yard cleaner; tie puller*; and rail-drill-bit sharpener attachment*—the last three machines being demonstrated in action, powered by auxiliary electric motors. D. Anderson, A. W. Banton, W. B. Blix, L. P. Brassy, C. L. Braunwarth; Z. Chitren, G. M. Cooper, G. M. Dallas, Wayne Downing, H. E. Erickson, J. R. Graham, Stan H. Haigh, Hugh Hawkins, J. E. Hogan, J. L. Holman, R. L. Holman, W. S. Isaacs, C. K. Jensch, Eugene Larson, Emil Pages, Ralph W. Payne, Will H. Reaves, E. H. Ricketts, Don N. Roddy, J. W. Samson, R. E. Schatmeyer, Stanley H. Smith, Lloyd O. Stratton, H. H. Talboys, Paul Wagner, Roger Watkins, L. D. Whitaker, W. C. Wilson.

Northwest Engineering Company, Chicago—Space 50N-51N—Photographs of shovels, cranes and draglines. H. N. Barkhausen, R. W. Cornelisen, C. R. Dodge, H. P. Hahn, E. J. Holland, D. T. LaRue, G. C. Williams.

Northwestern Motor Company, Eau Claire, Wis.—Space 33N-34N-35N—Section motor car with cab top*; B&B-gang car* with cab top*; light, all-service motor car* with cab top*; surface grinder; tie pusher. J. B. Akers, Jr., F. W. Anderson, E. J. Baker, William F. Beven, Otis B. Duncan, William D. Hoffman, T. P. Irving, F. O. Jarvar, W. B. Joyce, William Philipp, George G. Prest, S. A. Rishovd, William J. Roehl.

Nox-Rust Chemical Corporation, Chicago—Space 16N—Mastic compound* for protecting steelwork against corrosion, bridge ties and timber against fire and weathering; mastic crosstie sealer*. R. G. Clendenin, Earle A. Mann, Robert E. Mann, Fred L. Way, R. F. Wollek.

The Oliver Corporation, Industrial Division, Cleveland, Ohio—Space 31N-32N—Wheel tractor equipped with hydraulically operated mower and loader combination; industrial crawler tractor equipped with loader. W. E. Chapman, H. W. Davis, J. C. McCorkle, W. E. Miles.

Oliver Iron & Steel Corp., Pittsburgh, Pa.—Space 165—Drive spikes; timber grips; screw spikes; gage rods; track bolts; frog bolts; switch bolts; heel-block bolts; rivets; machine bolts; carriage bolts; lag bolts; drive lags; watertight bolts; flush-head, freight-car bolts; ribbed body bolts; cap screws; nuts; forgings. John C. Cullinan, George Eskofier, Edw. M. Welty, Carl Wingerson.

D. W. Onan & Sons Inc., Minneapolis, Minn.—Space 10—A 3-kw. air-cooled diesel generator unit*; a 5-kw. portable gasoline generator unit; a 750-watt portable engine-generator unit; a 5-kw., 180-cycle, portable engine-generator unit. Jim Akers, Caesar Baldassari, T. C. Cole-

Look For These New Products

Manufacturer	*Space*	*New Products*
Air Reduction Sales Co.	22S	Radiagraph flame cutting machine
Armco Drainage & Metal Products Co.	26-27	Multiple-plate pipe with sheeting headwall
R. H. Bogle Company	45N	Dual-spray equipment
The Buda Company	42-62	Power track drill; bonding drill; hydraulic jacks, fork-lift truck
Caterpillar Tractor Co.	77 to 80 97 to 100	Tractor ballast cleaner; small tractor and excavator loader
Eaton Manufacturing Co.	82-83	Spring washers for frogs and Xings
Electric Tamper & Equip.	106 to 110	Mover for multiple tamper; tamper set-off lift; new power plants
Fairmont Railway Motors	128 to 135 147 to 154	Tie nipper, spike puller, rail lifter
Brice Hayes Co.	21S	Lining & surfacing telescopes
Homelite Corporation	177-178	Dual-purpose high-cycle generator
International Harvester	52 to 55 72 to 75	Skid loader
Jackson Vibrators, Inc.	21N to 23N	Vibratory compactor
Kalamazoo Mfg. Co.	57 to 59	Extra-gang motor car, inspection car, material expediter
Kershaw Mfg. Co.	26S to 28S	Ballast regulator & scarifier
The Lehon Company	95	Wood preservative & waterproofer; waterproofer for masonry
Mall Tool Company	11-12	Electric hand chain saws
Master Builders Co.	175-176	Floor resurfacer; ground-iron compound to plug spike holes
Matisa Equipment Corp.	19N-20N	Auxiliary track equipment
Nordberg Mfg. Co.	7S to 20S	Gaging machine; tie puller; rail-drill-bit sharpener
Northwestern Motor Car	33N to 35N	B&B-gang car; motor-car cab tops
Nox-Rust Chemical Co.	16N	Crosstie sealer; fire-retardant and rust-preventive compound
D. W. Onan & Sons, Inc.	10	Air-cooled diesel generator unit
Permamix Corporation	43N	Floor resurfacing compound
Pettibone Mulliken Corp.	31 to 36	Switch clips and rods; front-end loader; mobile swing crane; fork lift; front-end swing loader
Railroad Accessories	5N-6N	Power bonding drill
Railroad Products Co.	182	Flow-control volve; improved ejector-type hydrant; two-step safety claw bar
Railroad Rubber Products	42N	Liquid rubber coatings
The Rails Company	101	Electric switch heaters, graphite tape lubricator
Railway Maintenance Corp.	122 to 126	Ballast-shoulder cleaner; multiple-tool air tamper
Railway Track-work Co.	13N to 15N	Rail-bit sharpener, tie nipper
Templeton, Kenly & Co.	46-47	Tie remover and inserter
United States Steel Co.	6-7	Manganese-steel Xing & pedestal base; stainless-steel roofing, siding and drainage systems
Wood-Treating Corp.	170	Wood-preservative spike-hole filler, applicator and pegs
Woolery Machine Co.	3S to 6S	Tie-end remover; track-tool transporter
Wright Power Saw & Tool	52N	Pneumatic power saw

man, P. W. Copeland, Stan Hague, Hiram Hascall, Ted Johnson, Ken Taylor, John N. Thorp, C. R. Turner, W. R. Walsh.

Oxweld Railroad Service Company, New York —Space 88-89—Oxyacetylene apparatus for welding, cutting, flame-cleaning, and flame-hardening; specimens of oxyacetylene pressure-welded rail; flame-cleaned rail and rail ends; flame-hardened rail; built-up rail ends and driver burns. G. P. Bogert, R. J. Boyle, M. Burnett, Jr., W. E. Campbell, F. J. Duffie, F. M. Finsthwait, F. J. Graham, E. B. Hall, W. A. Hogan, P. Hunter, Jr., A. E. Jacobson, W. Jones, R. S. Kerns, R. G. Kohn, J. W. Lacey, P. T. McKinney, H. R. Miller, R. J. Nenneman, D. H. Pittman, J. Ritcey, J. H. Rodger, C. R. Strutz, K. I. Thompson, R. W. Torbert, S. Toth, J. E. Winslow.

The P. & M. Co., Chicago—Space 90-91—Rail anchors. S. M. Clancey, D. M. Clarke, T. C. Coleman, J. J. Gallagher, W. J. Garrity, P. H. Hamilton, J. E. Mahoney, J. J. Metzger, C. J. Miller, G. E. Olson, R. W. Payne, W. H. Reaves, M. K. Ruppert, R. C. Schulze, F. R. Wood, Wallace Wood.

Pacific Coast Borax Company, Los Angeles, Cal.—Space 168—Non fire-hazardous weed-killing chemicals. G. C. Buskirk, J. T. Carroll, E. F. Cottier, O. A. Ponder, F. T. Winters. Jr.

Permacrete Products Corporation, Columbus, Ohio—Space 138—Models of precast concrete slabs, sectional buildings, booths, foundations, and cribbing. Glenn Grant, D. V. Maher, J. A. Roche.

Permamix Corporation, Chicago—Space 43N—Floor resurfacing compound*. R. J. Noren, Jr.

Pettibone Mulliken Corporation, Chicago—Space 31-32-33-34-35-36—Forged-steel adjustable rail braces; spring-switch mechanism; switch stands; hydraulic retarder for spring frogs; rerailing frogs; shoulder bolts; one-piece guard rails; under-car loaders and conveyors; clamshell and dragline buckets; track cleaner; switch clips and rods*; front-end loader*; mobile swing crane*; fork lift*; front-end swing loader*. J. H. Asselin, W. A. Blackford, W. F. Brietzke, W. A. Enstrom, L. A. Grego, L. R. Harlacher, E. C. Phillips, E. J. Seifert, E. H. Sockwell, K. von Kampen, W. E. Weiss.

The Philip Carey Manufacturing Company, Cincinnati, Ohio—Space 49N—Car cement; fibered asphalt emulsions; corrugated asbestos-cement sheets; fire-retardant asbestos plastic shingles; asbestos-cement boards; locomotive lagging; asbestos-cement siding; high and low-temperature industrial insulations; aluminum general-purpose coatings. A. E. Binger, W. M. Gibbs, Norman Harper, H. B. Johnson, E. D. Smith, W. Sparker, L. Charles Underwood, G. E. Warner.

Pocket List of Railroad Officials, New York —Space 114—Copies of Pocket List. John A. Pattee, B. J. Wilson.

Power Ballaster Products Department, Pullman-Standard Car Manufacturing Company, Chicago—Space 1-2-3-19-20-21—Working scale models of power ballaster, cribber, cleaner, track dresser and tie spacer; motion pictures of machines in use. J. B. Bell, Frank Benko, John Benko, R. W. Bogan, R. C. Caldwell, T. H. Callahan, J. A. Curtis, J. M. DuBois, Harry Dumich, H. W. Foster, T. Y. Gehr, Fred Grant, G. W. Morrow, F. H. Philbrick, Warren Porter, E. F. Turner.

The Q & C Co., New York—Space 111—point guard; car stops; derails; compromise joints; guard-rail clamp; one-piece manganese guard rail; rail tongs; gaging tool; adjustable rail brace; flangeway bracket; electric snow melter; foot guards. Paul Chynoweth, T. C. Coleman, Jr., L. E. Hassman, M. Iseldyke, Jr., John H. McCartney, A. D. Morrow, J. C. Neimeyer, George G. Prest, G. H. Proffitt, W. L. Ricker, Lewis Thomas, Lewis Wright.

Racine Tool & Machine Co., Racine, Wis.—Space 15-16—Portable rail saw; unit tampers; rail drill; bonding drill. A. B. Andrews, George W. Christiansen, M. E. Erskine, Stan Haigh, R. B. Hill, Glenn Hunt, E. R. Larson, J. B. Lawrence, E. R. Mason, H. A. Schultz.

Rail Joint Company, Inc., New York—Space 60-61—Standard compromise, and insulated joints; insulating fiber. W. J. Acker, Alex Chapman, Geo. Clodfelter, E. A. Condit, H. L. Emerson, K. W. Engstrom, J. A. Greer, R. W. J. Harris, Sam Harrison, H. C. Hickey, H. L. Lansing, G. H. Larson, J. N. Meade, T. I. Moore, R. W. Payne, Thomas Ryan, J. A. Sadler, E. F. Schermerhorn, J. E. Sporre, F. R. Wood, W. F. Wood.

Railroad Accessories Corporation, New York —Space 3N-6N—Power track wrench; lightweight power bonding drill; power bonding drill*. F. T. Anderson, E. M. Deems, Jr., L. Kelley, F. C. Lavarack, B. A. Lundy, Jr., M. R. Waller.

Railroad Products Company, Cincinnati, Ohio—Space 182—Flow-control valve*; an improved design of ejector-type hydrant*; two-step safety claw bar*; couplings for hose connections to diesel locomotives; water and oil columns for delivery of fluids to diesel; switch stands. Bill Beven, Otis B. Duncan, Art Gambetta, Dan J. Higgins, Jas. W. McGarry, George G. Prest, Henry E. Vogel, Bert Williams.

Railroad Rubber Products, Inc., Ashtabula, Ohio—Space 42N—Rubber rail-abrasion pads; rubber tie pads, rubber cushions for railroad crossings; liquid rubber coating* for use on steel and concrete. Thomas E. Brown, R. A. McClung, Nelson K. Moses, James Nemec, O. Summanen.

The Rails Company, New Haven, Conn.—Space 101—Compression-type rail anchors; torque-type anchors; bridge-tie anchors; propane-gas switch heaters and automatic ignition assemblies; electric switch heaters*; automatic switch-point locks; two types of kerosene switch heaters; graphite tape lubricator*. R. E. Bell, R. H. Bell, G. N. Burwell, L. T. Burwell, F. W. Holstein, F. W. Schmidt, J. V. Wescott.

Railway Age—Railway Engineering and Maintenance, Chicago—Space 76—Special audience-participation display; copies of registration Dailies; copies of publications. C. Miles Burpee, Richard F. Burkhart, J. S. Crane, Merwin H. Dick, R. E. Dove, Harry H. Melville, C. W. Merriken, Jr., Henry E. Michael, Ralph M. Schmidl, Fred W. Smith, John R. Thompson, W. G. Vanderpool, John Vreeland, Paul R. Warwick, Jr., John A. Ferguson.

Railway Maintenance Corporation, Pittsburgh, Pa.—Space 122-123-124-125-126—Multiple-tool air tamper*; tractor-powered, ballast-shoulder cleaner*; movies of crib cleaner, ballast cleaners and intertrack excavator in operation. John F. Casey, Jr., M. R. Hoffman, R. M. Jenner, R. M. Johnson, J. B. McWilliams, E. J. Powell.

Railway Purchases and Stores, Chicago—Space 160—Copies of publication, J. P. Murphy, Jr., K. F. Sheeran, Edward Wray, John E. Wray.

Railway Track-work Company, Philadelphia, Pa.—Space 13N-14N-15N—Power track drill; "walk-off" flexible-shaft grinder; rail-joint cross grinder; ballast cribbing machine; rail-bit sharpener*; tie nipper*. C. R. Bell, R. E. Bell, W. H. B. Bevan, Wm. D. Hoffman, John B. Moore, Fred S. Schwinn, Jr.

Reade Manufacturing Company, Inc., Jersey City, N. J.—Space 8-9—Weed killer; track liner; safety claw bar. G. F. Carpenter, D. M. DeWitt, C. A. Parish, Charles F. Reade, Charles H. Reade, Leonard J. Reade, Fred Sautter, Charles Sherman, Herman Steudel, W. L. Tanner.

Rust-Oleum, Evanston, Ill.—Space 13—Photos of rust preventive applied directly over rust; demonstration of rust preventive applied to rusted panels. Russell B. Arnold, Walton Collins, W. W. Fetner, J. D. Hadden, W. D. Jenkins, H. Fred Jorgensen, Charles W. Matthews, J. C. Simmons, Thomas Smith, Frank Sweeny, John N. Thorp.

Rydin Railway Equipment Company, Chicago —Space 46N-47N—Automatic couplers for motor cars and trailers. J. B. Akers Jr., Caesar Baldassari T. C. Johnson, Carl N. Rydin, Glenn W. Rydin, F. S. Schwinn, Jr.

Schramm, Inc., West Chester, Pa.—Space 7N—Self-propelled tractor-compressor and accessories, including air hose, tie tampers and other pneumatic tools. Fred L. Eckert, James A. Gade, Roy Hearl, Larry Isaman.

Simmons-Boardman Publishing Corporation, Chicago—Space 76—See Railway Age.

Sperry Rail Service Division, Sperry Products, Inc., Danbury, Conn.—Space 143-144—Rail testing information and literature. J. M. Dickey, H. C. Drake, J. W. Eaton, J. B. Farwell, W. K. Hooper, J. S. Kemble, D. J. LaClair, H. E. McCurdy, L. L. Schmuecker, J. A. Stueven, S. A. Thompson.

The Tapecoat Company, Evanston, Ill.—Space 171—Demonstration of application and use of protective coating to pipe. A. W. Bohne John G. Bolling, Burt Schmidt, John F. Walsh.

Taylor-Colquitt Company, Spartanburg, S. C. —Space 159—Samples of dried and treated crossties of various species; samples of car lumber treated with pentachlorophenol and solvent recovered; samples of car lumber pressure treated with copper naphthenate and solvent recovered. W. E. Gadd, D. M. Graves, M. S. Hudson.

Teleweld, Inc., Chicago—Space 96—Literature on service for railroads. W. E. Bugbee, H. E. Finley, C. E. Haman; O. R. Hansen, C. W. McKee, H. E. McKee, J. A. Foche, C. A. Sawyer, S. H. Smith.

Templeton, Kenly & Co., Chicago—Space 46-47—Complete line of track jacks, including two models with aluminum alloy housings; rail expanders; tie spacers; bridge jacks, including jack support; remote-control hydraulic jacks and pullers; tie remover* and replacer; track shifters. W. D. Boldt, L. F. Cooper, R. B. Hill, W. E. Gahl, W. B. Joyce, P. H. McManus, E. Maves, J. L. McMillan, N. L. Montgomery, G. G. Prest, Wm. Roehl, M. Simpson, W. Simpson, A. C. Templeton, J. B. Templeton, E. A. Zimmerman.

Timber Engineering Company, Washington, D. C.—Space 173—Timber connectors; framing anchors; literature on connectors. R. L. Fletcher, R. H. Gloss, L. P. Keith, Charles Wilcox.

True Temper Corporation, Cleveland, Ohio —Space 56—Rail Anchors. C. C. Connolly, J. J. Nolan, F. J. Reagan, Robert Simpson, R. J. Whalen.

United States Steel Company, Pittsburgh, Pa. —Space 6-7—Manganese-steel railroad crossing with new pedestal base*; stainless steel* for roofing, siding and drainage systems. E. W. Backes, J. G. Brooks, G. C. Bruner, R. W. Claypoole, W. G. Devereaux, B. A. Lucas, Jr., Samuel McClements, Jr., H. H. McDonald, R. T. Moore, J. A. Reed, T. P. Riley, G. N. Schramm, J. R. Scott, C. T. Siebert, Jr., B. W. Shauger, H. A. Troxell, L. B. White, Jr.

The Warner & Swasey Co. Cleveland, Ohio —Space 23S-24S-25S—An improved rubber-tired grading machine with hydraulically operated boom and bucket. S. F. Beatty, John Dix, Henry Wellman.

Western Railroad Supply Company, Chicago —Space 118-119-120—Railroad-highway grade-crossing signals; arresters, bootlegs, resistances and other signaling accessories; arresters, terminals, unit switchboards, jacks, plugs, protectors and other communications accessories; bridge lights, pier lights and movable-bridge accessories; electric and reflector-lens type switch lights; annunciators, "o-s" device speed-checking equipment, highwater detector and electrical testing and measuring instruments. A. W. Boorom, H. J. Brown, T. H. Cole, S. E. Gillespie, J. Hensel, J. E. Hogan, C. M. Hurlbut, L. H. Jacoby, J. S. Miller.

White Manufacturing Company, Elkhart, Ind.—Space 136-137—Switch heaters with remote control equipment; several models of concrete vibrators and grinders; different types of kerosene torches and burners. L. D. Gardner, Stan H. Haigh, Merritt A. King, Edward R. Mason, John A. Roche, W. McK. White, W. McKean White, Jr.

Wisconsin Motor Corporation, Milwaukee, Wis.—Space 17-18—Four-cylinder air-cooled engines; two-cylinder and single-cylinder models; cut-away four-cylinder engine; cut-away two-cylinder engine. Ray J. Fellows, Phil Norton, H. A. Todd.

Wood-Treating Corporation, Cleveland, Ohio —Space 170—Special preservative compound with its applicator and auxiliary pegs for increasing spike adhesion and rehabilitating spike holes in ties*. B. Blowers, Jr., John W. Carpenter, T. C. Johnson, F. E. Taplin.

Woodings-Verona Tool Works, Chicago—Space 63-64—Advanced-type rail anchors; fixed-tension springs; track tools. R. F. Davis, F. A. Douglass, C. K. Luyster, R. J. McComb, G. L. McKewin, J. M. Moore, P. E. Reberk, W. H. Woodings.

Woolery Machine Company, Minneapolis, Minn.—Space 3S-4S-5S-6S—Tie cutter; tie-end remover*; track-tool transporter*; motor car. H. W. Lewis, R. J. Moe, F. S. Schwinn, Jr., J. R. Smith, K. A. Taylor, L. E. Woolery, W. F. Woolery.

Wright Power Saw & Tool Corp., Stratford, Conn.—Space 52N—Precision power saw* operating from a portable compressor. B. Cowan, C. C. Kennedy, I. F. Woodland, J. W. Wright.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 211)

HYDRAULIC RAIL LIFTER

FAIRMONT Railway Motors, Inc., Fairmont, Minn., has announced the W86 Series A hydraulic rail lifter for removing and inserting tie plates.

The actual lifting mechanism of this machine is incorporated in a semi-enclosed beam mounted on pantograph arms. These arms are spring counterbalanced so that the lifting beam can be raised or lowered with a minimum of effort. Mounted on the beam are two single-acting hydraulic rams, the control valve, a rail-clamp lever, and rail clamps. The linkage for these clamps is such that the greater the pull the tighter they grip the rail. The supporting frame or chassis is of welded construction and has four alloy cast-steel rail wheels that turn on sealed-for-life ball bearings. Also on this chassis are the engine and direct-driven hydraulic pump, unloading valve, pneumatic set-off wheels, and self-storing extension lift pipes.

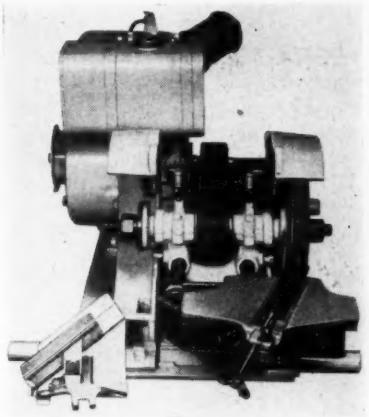
In operation the machine is placed over the tie from which the tie plates are to be removed. Then the lifting beam is moved down against the rail and the clamp control lever shifted to the engaged position. Opening the hydraulic valve causes the two rams to push down against the tie. This forces the lifting beam upward, and since the rail clamps hold the rail to the lifting beam, the rails are also raised. Tie plates can then be removed or inserted as desired. When the pneumatic wheels are in the lower position and the lift pipes extended, it is relatively easy for two men to remove the machine from the track.

NEW FLOOR PATCHING COMPOUND

PERMAMIX, a quick-drying, ready-mixed floor patching compound, is the latest development of the Permamix Corporation, Chicago. The manufacturer claims that this compound may be effectively employed for protecting, resurfacing and repairing all types of floors, ramps, platforms and loading docks. This material is said to be immune to the effects of temperature and humidity extremes, in addition to possessing the property of becoming harder with continued use. Permamix can be applied using only a broom and a paving tamper. It is supplied in 50-lb. fiber drums, with a can of primer packed inside each drum.

RAIL DRILL BIT-SHARPENER ATTACHMENT

THE Nordberg Manufacturing Company, Milwaukee, Wis., has developed an attachment for sharpening flat-beaded rail drill bits, which is designed for use with the Nordberg bit grinder. Designated



as Model DA-2, this device is said to fulfill all the requirements for obtaining perfectly sharpened bits. The manufacturer claims that, after a few minutes instruction, anyone may sharpen bits with this device, obtaining accurate results everytime.

RAIL JOINT LUBRICANT

AFTER extensive research and laboratory and field testing, The Texas Company, New York, announces the production of a new rust-preventing lubricant for use at rail joints, which is known as Texaco Rail Joint Lubricant. This new product, which is designed for spray application, regardless of moisture conditions, to rail joints for minimizing the hazards of rail misalinement and failure of signal systems due to frozen joints, is a blend of high-quality straight min-

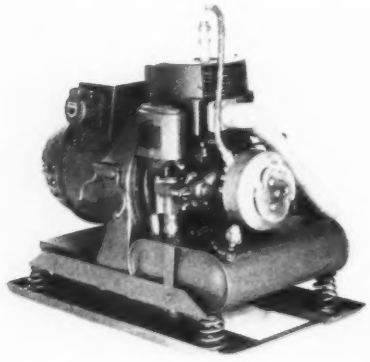
For additional information on any of the products described on these pages, use postcards, page 211.

eral oil and a special additive. The additive is said to impart unusual adhesiveness and water resistance.

From field tests conducted for over a year on a major railroad, it was shown that the new lubricant (1) is sufficiently fluid under normal atmospheric conditions to be applied by spraying; (2) adheres strongly to the metal surfaces to form a rust-preventing film which remains pliable even at sub-zero temperatures, but will not evaporate in hot weather; (3) provides continuous lubrication due to its permanently fluid state; and (4) is relatively unaffected by prolonged and violent water washing.

HIGH-CYCLE GENERATOR

THE Homelight Corporation, Port Chester, N. Y., has recently introduced a new dual-purpose, high-cycle generator, designated Model 24HY-1. This generator provides high-cycle alternating current for the operation of electric tools, as well as direct current for floodlighting and the operation of universal tools. The unit is powered by a one-cylinder, air-cooled, two-cycle gasoline engine, which is said to operate for 1¾ hr. on a gallon of fuel at full load. It develops 2500 watts of 180-cycle, 3-phase, 230-volt alternating current, as well as 2500 watts of 110-volt direct current. Outstanding features of this generator include large-sized carbon brushes, specially-treated armature and field coils, and "V" ring commutator construction. Weighing 125 lb., the generator unit is 25 in. long, 18 in. wide, and 20 in. in length.



TIE PULLER AND INSERTER

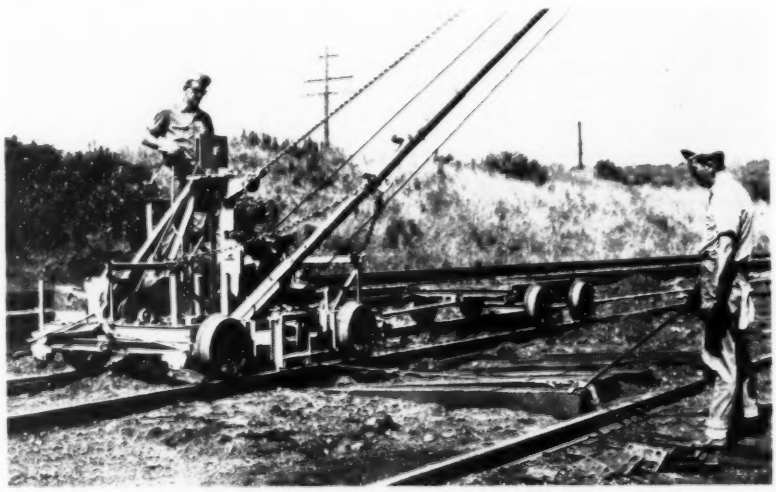
THE GANDY, a self-propelled three-purpose machine developed by the Nordberg Manufacturing Company, Milwaukee, Wis., is a combination tie puller, tie inserter, and light crane, designed primarily for use in out-of-face tie-renewal and track-raising operations. On such jobs, it can be employed to remove and insert ties and to perform a variety of light loading jobs.

The Gandy is comprised basically of a frame mounted on four wheels, a power-driven winch, and a telescoping boom. When employed in its tie-pulling capacity, the boom, fully extended, is lowered to an almost horizontal position at right angles to the track, and a brake and thrust member is placed in contact with the gage side of the head of the rail on the operator's side. The winch cable, extending from the end of the boom, is fastened to tongs attached to the end of the tie, so that when power is applied, the tie is pulled from the track.

To insert new ties with the Gandy, the boom is first raised to a position approximately 45 deg. to the horizontal. A demountable sheave is locked in position on the lower portion of the frame and a detachable thrust member is placed in position on the machine and against the rail under which the tie must first pass. The cable is then passed around the sheave and out over the head of the rail. The free end of the cable is fastened to a specially designed tong which grips the end of the tie. The operator causes the winch to draw in on the cable, and the operator's helper guides the tie as it is pulled into place by means of a long handle attached to the special tong. The helper can control the tie both in direction and elevation by the pressure he exerts on the handle.

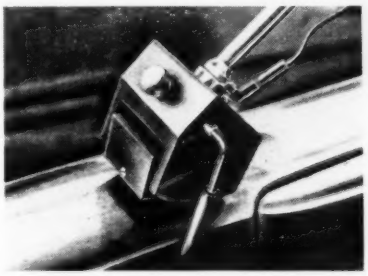
When used as a crane, the Gandy will handle loads up to 2000 lb., and may be employed to load or unload ties and other material, and to lift comparatively light track machines on or off the track.

The Gandy is powered by a Briggs & Straton Model 14B air-cooled, single-cylinder 4½ hp. gasoline engine, which drives the two double-bevel frictions (for propulsion and winch) through a fluid coupling.

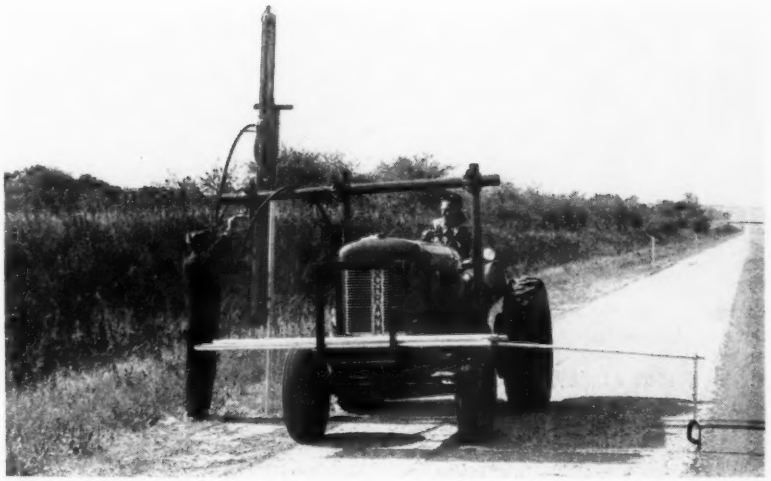


QUARTZ WEARPLATES FOR RAIL FLAW DETECTOR

SEARCHING units used with the portable Audigage Rail Flaw Detector, manufactured by Branson Instruments, Inc., Stamford, Conn., can now be protected from mechanical wear with quartz wearplates. These plates are presently being installed by the manufacturer



on both long-handled and hand searching units. Testing speed is said to be substantially increased since the protected searching unit can be slid over continuous sections of track in grade crossings, tunnels, station platforms, and other critical locations. Old type searching units with plastic wearplates can be returned to the manufacturer for installation of the quartz wearplates.

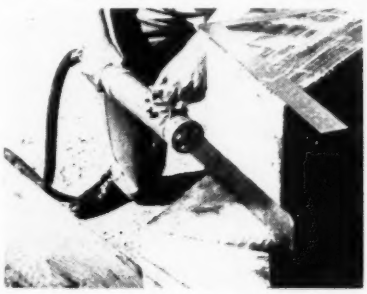


STAKE DRIVER

THE Pneumadriver, manufactured by Schramm, Inc., West Chester, Pa., is claimed to possess the ability to drive all types of stakes and wood or steel fence posts in one-tenth the time required for driving by hand. The device consists of a 7-ft. air feed and a paving breaker, designed for mounting on the Schramm Pneumatractor. The paving breaker is fitted with a special steel designed to fit the stake or post to be driven. The manufacturer states that, when the unit was employed on construction of the New Jersey Turnpike, over 350 stakes were driven per day by a two-man crew using a Pneumadriver, as compared with an estimated 4 stakes per man-hour when a 5 to 15-man crew was engaged in hand-driving stakes.

IMPROVED POWER SAW

THE Wright Precision Power Saw, manufactured by the Wright Power Saw & Tool Corp., Stratford, Conn., has recently been improved through standardization of certain features. Chrome-plated saw blades with all-steel rivets are now standard on all units. The use of these blades, according to the manufacturer, results in reduced



friction which maintains blade sharpness and reduces corrosion. Micarta wear plates have been installed on the pistons with a consequent reduction in friction and increase in power. A nylon shuttle valve has increased the steel valve assembly service life. Furthermore, new heavy-duty pistons have been installed, giving the saw greater strength for all load conditions.

IMPROVED OFF-TRACK BALLAST CLEANER

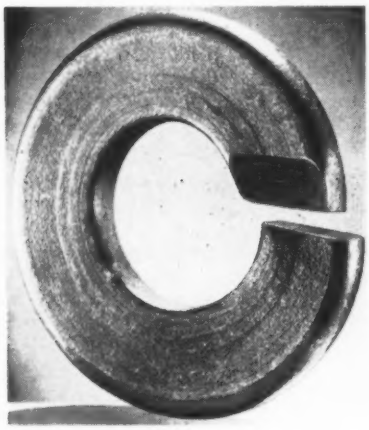
THE McWilliams Super Mole ballast cleaner, developed by the Railway Maintenance Corporation, Pittsburgh, Pa., has now been standardized and several improvements have been incorporated in it. These include the introduction of a power-operated adjustment of the head, independent of the body of the machine, which, it is said, permits the leveling of the subgrade independent of the supporting track; and the use of an entirely new principle of hydraulic vibration for the screens. The latter improvement provides means for leveling the main screen and includes a vibrated ballast delivery chute, which is also a screen, thus increasing the screening capacity of the machine an estimated 35 per cent.

The McWilliams Super Mole is an off-track, tractor-mounted ballast cleaner, designed to clean shoulder ballast and dispose of excavated material.

For additional information on any of the products described on these pages, use postcards, page 211.

IMPROVED FROG WASHERS

A NEW spring washer, especially designed to meet the difficult problem of maintaining tight bolts on frogs and crossings and to provide adequate protection from looseness resulting from wear, is announced by the Reliance Division of the Eaton Manufacturing Company, Massillon, Ohio. This washer, known as the Frog and Crossing Hy-Crome Spring Washer, is helical in form, will flatten at a sufficient predetermined applied load, and is reported to have a wide

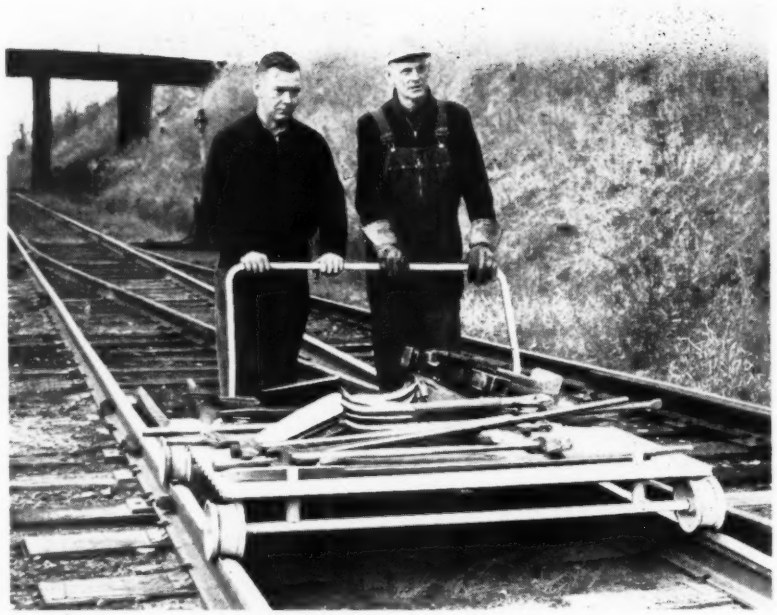


range of reaction and adequate pressure for providing tension pending maintenance tightening. It is so designed as to provide the nut with the necessary bearing surface, while its ground deflected ends are said to make reapplication possible without damaging the contacting parts. This new washer is available in sizes for 1⅝-in., 1¾-in., 1⅞-in. and 1½-in. (thread diameter) bolts.

IMPROVED MOWER

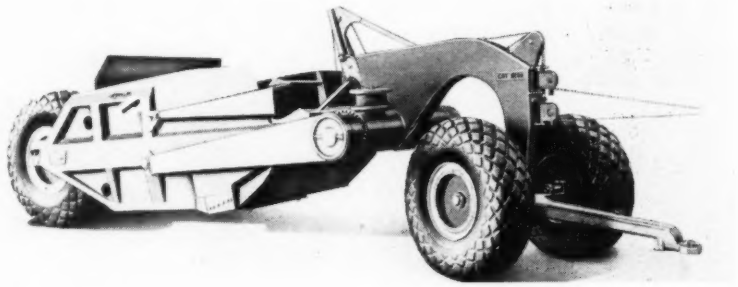
RECENTLY announced by the Oliver Corporation, Cleveland, Ohio, are several improvements incorporated in the design of the Oliver Hydro-Mower, now called the Hydro-Cut Mower. This machine is a side-arm, hydraulically-operated mower adapted for use with Oliver industrial tractors. Some of the notable improvements are: A redesigned flywheel, with a ball-bearing crank pin that requires

(Cont'd. on next page)



LIGHTWEIGHT TRACK TOOL TRANSPORTER

LATEST development of the Woolery Machine Company, Minneapolis, Minn., is the Model 3T Track Tool Transporter. This device has a 4-ft. by 5-ft. weatherproof plywood deck backed with corrugated steel, which is supported on a four-piece tubular steel frame mounted on four 6-in. insulated wheels. The unit is provided with a tubular steel push handle which may be attached at either end of the car. It is said that the entire unit may be easily set up or dismantled in less than a minute for easy loading on a truck, bus or motor car. Although it weighs only 160 lb., the Model 3T is said to be capable of carrying up to 1000 lb. of tools and materials.



SCRAPER FOR HIGH PRODUCTION

THE Caterpillar Tractor Company, Peoria, Ill., has announced a new scraper, called the No. 90, with a struck capacity of 21.2 cu. yd., or 40 per cent greater than that of previous models. The new model, which is designed for use with the Caterpillar D8 tractor, moves dirt with the aid of a hard-surfaced, reversible cutting edge. Material is carried in a flat, double-bottom bowl of high-tensile steel. The scraper is operated through a cable-control unit which can be mounted on the rear of the tractor to provide for positive loading and ejection.

The No. 90 is equipped with two 24.00-29 tires at the front and two 27.00-33 tires at the rear. Each axle is equipped with tapered roller bearings. When the scraper is loaded, 60 per cent of the weight is carried on the rear tires.

The scraper's struck capacity of 21.2 cu. yd. can be increased to 25.5 cu. yd. through the use of top extensions or sideboards. Likewise, through the use of sideboards, the heaped capacity of the unit can be increased to 31 cu. yd.

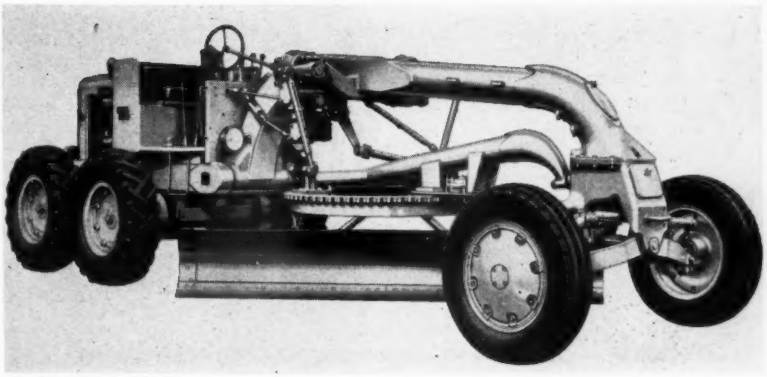
lubrication but once each season; a Pitman drive; a knife assembly with double back-bar and machined ball; a cast mounting plate assembly; and an improved combination valve and tank assembly.

The new mower may be employed on Oliver industrial tractors in combination with other attachments, such as Ware front-end loaders, Hydro-Brooms, and wheel-tractor dozers.

TIE NIPPER

THE Railway Track-work Company, Philadelphia, Pa., has recently announced the production of the G. & H. Tie Nipper. This device consists of a crossbeam supported on one side by a roller and on the other by a pair of double-flanged wheels which ride on the rails. Mounted on the crossbeam is a frame which serves as the ful-

crum for a lever by means of which the lifting action for nipping the ties is applied. Fastened to the forward end of the lever is a pair of tie tongs which can be fastened and released by means of a lever within convenient reach of the operator. By applying his weight on the end of the lever, one man can easily exert enough pressure to nip the tie against the rails while spikes are being driven.

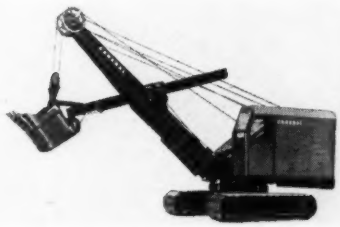


MOTOR GRADERS

TWO completely new motor graders, designated models AD-40 and AD-30, have been announced by the Tractor Division of the Allis-Chalmers Manufacturing Company, Milwaukee. They are said to incorporate features of construction and design that permit new standards of performance, operating ease and service simplicity. Model AD-40, which weighs 23,000 lb., is powered by a 4-cylinder, 2-cycle diesel engine developing a brake horsepower of 104, while the Model AD-30, weighing 22,700 lb., is powered by a 3-cylinder, 2-cycle diesel engine developing 78 hp.

Features of these motor graders include tandem drives said to guarantee full traction under any ground conditions; completely enclosed hydraulic booster systems claimed to provide effortless steering; high axle clearances; and accurate blade control—all of which are said to combine to offer precision cuts and smooth finishes on construction or maintenance work. Accessories and special attachments are available for these graders, thus increasing their adaptability to meet a wider variety of specialized applications and conditions.

New standards of operating ease said to be incorporated in these graders include complete visibility, needle bearing mounted operators' seats, freely accessible controls, large roomy platforms on single tubular frames, and all-around operator comfort. Accessibility to major assemblies for repair or service is another important feature of these machines. By simply tilting forward the combined fuel tank and seat, the transmission, clutch and drive-shaft assemblies are exposed, enabling both the clutch and transmission to be removed without disturbing the engine or floor plates.



NEW SHOVEL-CRANE

THE General Excavator Company, Marion, Ohio, has added to its line of excavating and materials-handling equipment a new ¾-yd. unit called the Model 320. According to the manufacturer the new machine incorporates the latest advances in design and engineering, and is compact, sturdy, economical to operate and simple to maintain.

The crawler base, machinery side frames and deck of the machine are made of castings and rolled structural-steel shapes, used either separately or in combination to obtain the maximum advantage of each type of material and construction. The machinery is mounted well back on the deck to give stability and high lifting capacity with a minimum amount of counterweight. Ground bearing pressures are reported to be low. Twin Disc clutches are used for swing and travel motions, for raising and lowering the boom, and for retracting the shovel. Contracting band clutches are used on the hoist drums. Independent travel is an optional feature.

The Model 320 can be easily converted to shovel, clamshell, crane, piledriver, dragline, or hoe operations in the field. The standard shovel boom is 18 ft. 8 in. long, and the standard crane boom is 35 ft. long. The standard length of the crawler is 11 ft. 4 in., with treads of 20 in., 25 in., or 30 in.

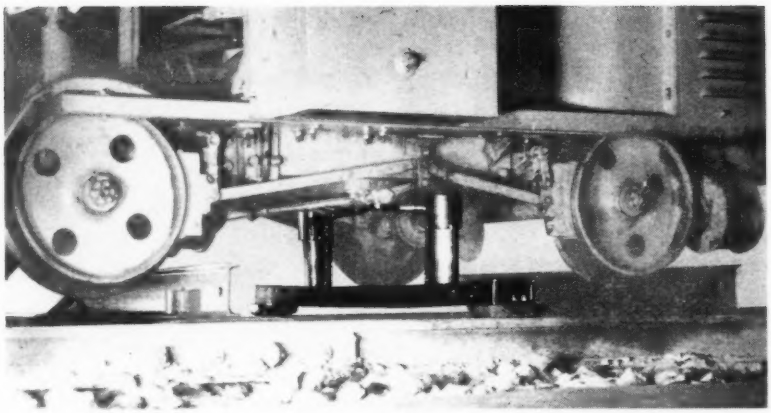
For additional information on any of the products described on these pages, use postcards, page 211.

The three types of toggle tongs offered by the Mack Welding Co. Type A (top), Type B (center), and Type C (bottom)

SAFETY TOGGLE TONGS

THE Mack Welding Company, Duluth, Minn., has recently made available three types of toggle tongs for use in handling ties, bridge timbers, poles and other material.

These tongs, shown in the accompanying illustrations, are designated as types A, B, and C, and are equipped with drop-forged points of heat-treated tool steel, which are replaceable and interchangeable. Type A tongs have handles made of ¾-in. steel tubing, covered with non-slip rubber coated fabric and brass ferrules. Lightweight aluminum handles are standard on the B model, while the Type C tongs are equipped with handles made of lightweight, first quality straight-grained and seasoned wood. Net weights of the tongs are: Type A, 5 lb.-11 oz.; Type B, 3 lb.; and Type C, 5 lb.-9 oz.



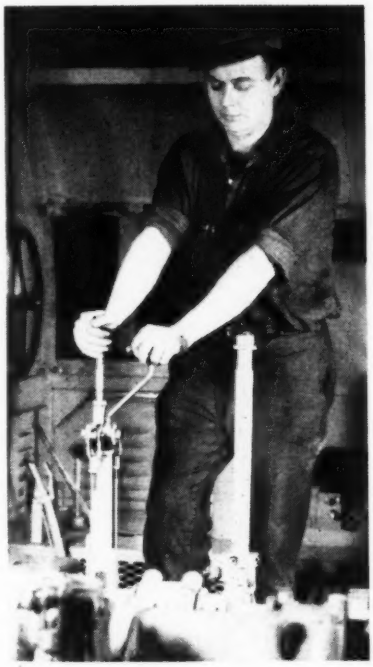
The Jackson Multiple Tamper hydraulic set-off lift shown in the raised position. Note that the set-off rails have been positioned under the set-off rollers

IMPROVED JACKSON MULTIPLE TAMPER

THE Electric Tamper & Equipment Co., Ludington, Mich., has announced two important improvements in the Jackson Multiple Tamper—a hydraulically actuated indexer for moving the machine from tie to tie, and a hydraulic set-off.

The indexer provides instantaneous forward and reverse action with positive braking. A single control lever regulates this movement and, since high speed and quick stops are assured, a time savings is effected. For emergency and special use, the hand wheel for manually moving the Multiple Tamper from tie to tie has been retained, although the wheel is not mounted on its vertical shaft when the hydraulic indexer is in use. It is said to be a simple matter, however, if the need should arise to use the manual indexing feature, to apply the hand wheel and cut out the automatic hydraulic indexer.

The hydraulic set-off lift has a tri-point, three-ram lift. With this device the operator can raise the Multiple Tamper off the track in 3 sec. or less by actuating a valve at the control stand. Then two men can quickly position the set-off rails under the set-off rollers. The machine is then lowered by the operator to engage the rails, and the Multiple Tamper pushed onto the set-off. The manufacturer claims that this operation may be accomplished in 60 sec. by the operator and two assistants.

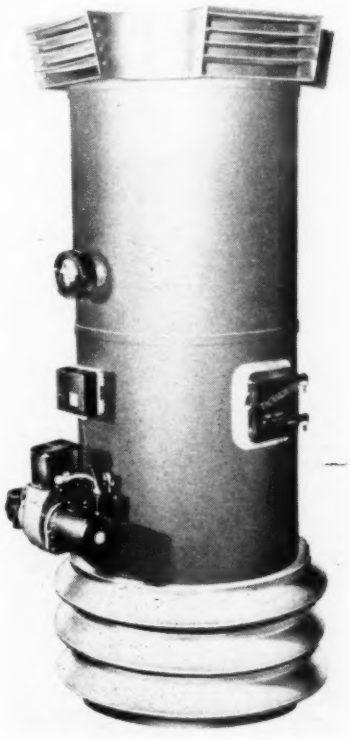


With the new indexing feature the movement of the Jackson Tamper from tie to tie and its accurate spotting are controlled by one man operating two levers

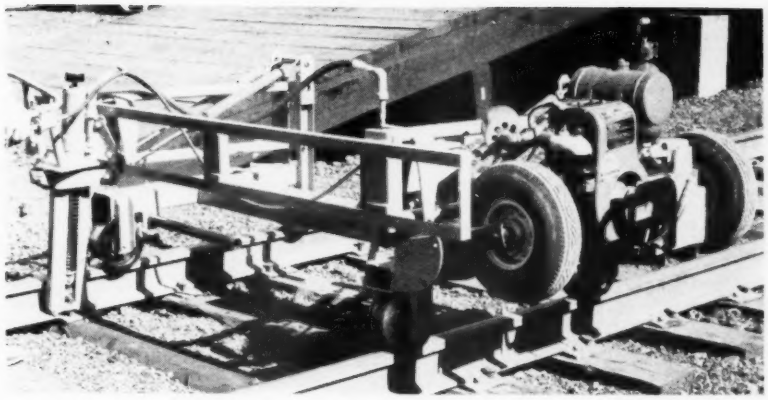
SELF-CONTAINED UNIT HEATER

THE Thermobloc Division of the Prat-Daniel Corporation, South Norwalk, Conn., has recently introduced a self-contained, direct-fired heater which may be employed in roundhouses, diesel repair shops, freight stations, and other railroad buildings. The heater is said to be especially suited for installation in buildings where there is heavy in and out traffic. The unit circulates heated air at working levels and is automatically controlled. The manufacturer states that the unit requires no complicated or expensive

piping, duct work or radiator installations, and that it is made ready for operation merely by connecting it with an oil or gas line and electric power. The heater unit,



available in either a floor or ceiling-suspended model, is claimed to be able to heat the working area within five minutes after it is put into operation.

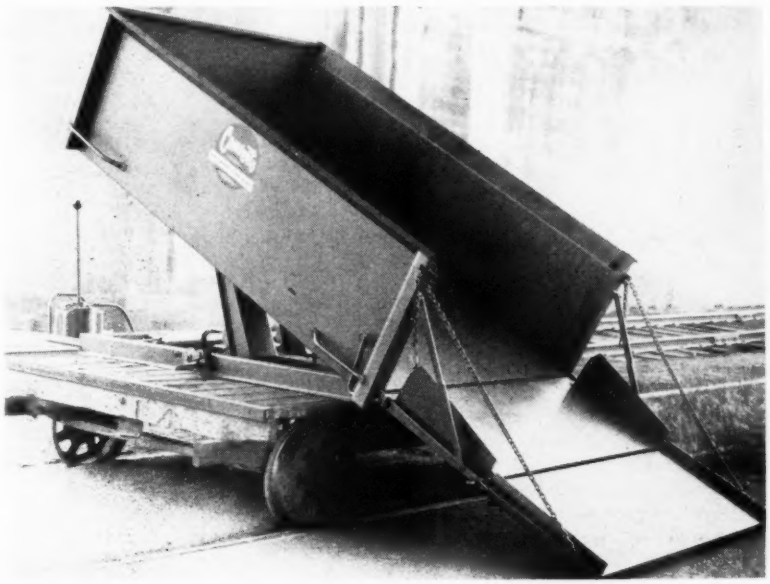


NEW HYDRAULIC SPIKE PULLER

A HYDRAULIC spike puller is one of the new products introduced by Fairmont Railway Motors, Inc., Fairmont, Minn. Only one man is required to operate this unit, and, because of the weight distribution, one man can remove it from the track. To aid in set-offs and re-railing, there are two hinged pneumatic set-off wheels and self-storing lift pipes.

Construction is such that the pulling assembly takes all the load. The guides for the puller jaws act as legs and support the hydraulic cylinder. The pulling assembly has a ball and socket mounting to permit some variation in order to locate the jaws properly over the spike. Puller mounting has sealed-for-life ball-bearing grooved wheels operating on a transverse alloy-steel track. This allows the unit to pull spikes from either rail while traveling in one direction. Pulling assembly is merely shifted from one end of the track to the other.

For easier operation the pulling assembly, mounting and track are supported by spring counter-balanced pantograph arms, and little effort is required to raise or lower the assembly, or to shift from one rail to the other. A single-cylinder air cooled-engine is direct connected to the gear type, self-lubricating pressure pump by a flexible coupling. The hydraulic system features an unloading valve for longer pump life, and a precharged bladder type of pressure accumulator to give faster action. This spike puller, known as the W84 series A, is intended for use by tie-renewal gangs. It can also be used in other work where operating economy can be effected by a machine having a pulling capacity of 8 to 12 spikes per minute.



IMPROVED PORTABLE RAILROAD DUMP UNITS

CONVERTO railroad dump units, manufactured by the Brice Hayes Company, Chicago, are now furnished with several improvements in design. Especially notable are the lifting handles secured to the sides of the body and the new trip-gate mechanism which permits "remote-control" dumping. Other improvements include a new locking catch, new stake pockets, new pump mounting, and new tail-gate design. The entire unit has been streamlined to provide a neat appearance and facilitate handling and operation.

The Converto railroad dump unit mounted on a push car. At the left can be seen the single operating handle which controls the hydraulic lift mechanism for raising and lowering the dump unit

For additional information on any of the products described on these pages, use postcards, page 211.

LAMINATED FIBER CONCRETE FORM

A LAMINATED fiber tube for one-time use as a form for concrete, adaptable to the construction of piers, columns, piles, culverts, etc., has been developed by the Sonoco Products Company, Hartsville, S. C. Called the Sonotube, this form is available in diameters of from 3 to 24 in., and in lengths up to 25 ft. In addition to its light weight, it is said to be low in cost as compared with conventional forms and of sufficient strength to resist any effect that vibrators may have upon it.

The Sonotube is claimed by the manufacturer to be particularly adaptable to installations in close quarters and may be easily cut to any desired length with a hand saw and set in place by one man. With a minimum of bracing, this form will receive concrete directly from a mixer or crane bucket without rising when the concrete is poured.

Being spirally wound and specially treated, the forms may be easily stripped after the concrete has set. One method of stripping, as suggested by the manufacturer, is to tape or otherwise secure a length of 0.032 or similar spring wire to the inner surface of the tube prior to pouring. Then, after the concrete has set, the form is split into two sections by merely pulling the wire down. Likewise, any sharp instrument such, as a linoleum knife or hatchet, may be employed to split the tube to aid in its removal.

When used in the construction of reinforced concrete piers or columns, the form need only be placed over the spiral or vertical reinforcing metal attached to the steel support already embedded in the footing. After bracing to the extent necessary to plumb the tube, concrete may be poured into the tube in the conventional manner. Columns ranging from 10 to 30 ft. in height, poured in sections and subjected to heavy loads, have been constructed in this manner. Concrete caps can be added and any desired bolts and steel beams for bracing can be set in place either prior to pouring or before the concrete has completely set.

The piers supporting this platform were constructed using Sonotube concrete forms

NEW TIE NIPPER

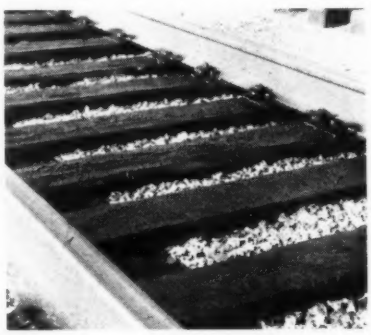
A NEW product, known as the W83 Series A Tie Nipper, has been announced by Fairmont Railway

Motors, Inc., Fairmont, Minn. The unit weighs 130 lb. and has a welded steel frame, insulated cast alloy steel wheels, and heat treated cast steel hooks with renewable heat-treated alloy steel points.

The connecting block for fastening the hook links to the handle is offset. When in use this offset is down and the hooks are in position to grab the tie. Giving the handle a 180-deg. turn brings the offset to the top and holds the hooks up and away from the ties. The workman can then push the unit along the track with the handle at a convenient height.

TIE PRESERVER

A NEW mastic product, Protek-Tie, manufactured by the Nox-Rust Chemical Corporation, Chicago, will increase the service life of crossties approximately one-third, according to the manufacturer. Protek-Tie is of such a consistency that it will flow down into the cracks and checks, thus keeping weather, brine drippings, mild acids and other deteriorating factors from prematurely breaking



down the structure of the tie. No aggregate is said to be necessary when using Protek-Tie.

Protek-Tie is applied to ties with

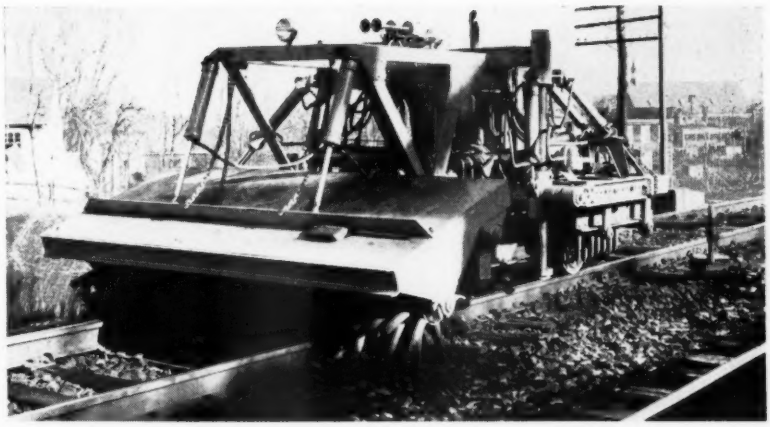
spraying equipment which permits coverage of approximately one tie per minute. Normal coverage of this material is approximately three ties per gallon, depending on the condition of the ties at the time of application.

WOOD PRESERVATIVE FOR STANDING POLES

A NEW wood preservative for treating the ground-line portions of standing poles or posts has been developed by the Chapman Chemical Company, Memphis, Tenn., in cooperation with the Dow Chemical Company, Midland, Mich. Named Pol-Nu, the product is a preservative grease containing 5 per cent pentachlorophenol. It weighs about 8 lb. a gallon and has a consistency about the same as cup grease.

The first step in applying the preservative is to remove the soil to a depth of about 14 in. from around the pole to be treated. Next, a coating of the preservative about ¼ in. thick is applied to the pole surface from a point 12 in. below the ground line to 6 in. above. This is done with pressure spray equipment similar to that used to apply lubricating grease. Finally, a wrapping is placed over the preservative and fastened to the pole. The purpose of this wrapping is to keep the preservative from moving into the soil instead of into the wood. Treating a 16-in. pole in this manner requires about a gallon of the preservative. The new product is also recommended by the manufacturer for treating the tops of poles and the tops of piles after they have been cut off.

After Pol-Nu is applied to a pole, the entire region is protectively wrapped



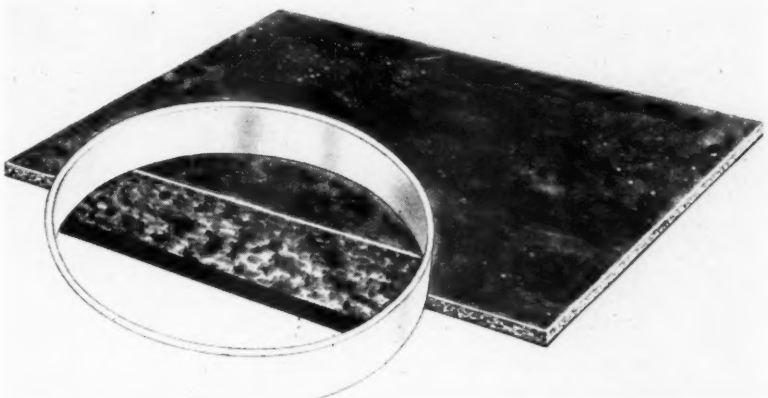
POWER-OPERATED TRACK DRESSER

THE Pullman-Standard Power Track Dresser, manufactured by the Pullman-Standard Car Manufacturing Company, Chicago, is said to be capable of performing all track dressing operations. It sweeps ballast from the ties, establishes a toe line, picks up and relocates excess ballast where desired, and shapes the ballast of both shoulders to the desired contour.

Powered by a 35-hp. gasoline engine, this machine is operated by one man who has finger-touch control of all of the machine functions. It is designed to perform the hourly track dressing output of the eight to ten laborers usually assigned to this type of work following a production tamping operation. The work-speed of the unit is approximately ¾ m.p.h. A running speed of approximately 25 m.p.h., and a power set-off mechanism facilitate its use in single-track territory, and enable the machine to make maximum use of available track time.

SELF-SEALING TIE PADS

FABCO self-sealing tie pads have been introduced by the Fabreeka Products Company, Inc., Boston, Mass., These are of the same materials and construction as Fabco uncoated tie pads with the addition of a special sealing compound applied to that side of the pad that is to be in contact with the tie. This sealer, applied to the pad by the manufacturer prior to shipment, is $\frac{1}{16}$ in. thick and is protected during storage and shipping by a temporary coating of powdered mica. The manufacturer claims that the sealing compound used on these pads provides an excellent bond between the tie and the pad, which effectively seals out all dirt and moisture. Since these pads are coated only on the side next to the tie, freedom of movement of the tie plate is permitted with less disturbance to the tie bond and less deterioration of the pad.



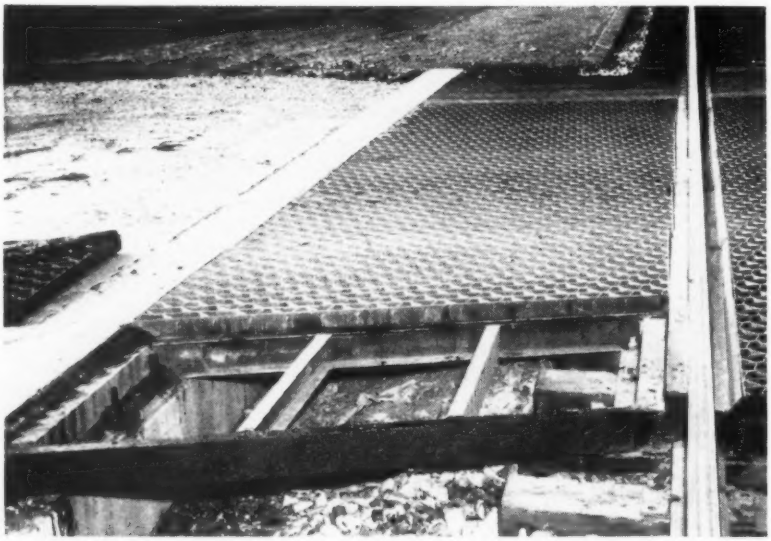
A magnified view showing the cross-section of a Fabco self-sealing tie pad. The dark portion on the lower edge of the pad is the 1/16-in. thick sealing compound

For additional information on any of the products described on these pages, use postcards, page 211.

DOUBLE-END LOADER

THE Oliver Corporation, Cleveland, Ohio, has recently announced the availability of the Strait-Line Hydraulic Loader Model 77, for use on the Oliver Industrial "77" wheel tractor. The Strait-Line is a double-end loader which can dig either in the front or rear. Dumping is always accomplished in the front and, since the operator is free to select either front or rear digging, he can load without twisting or turning the tractor. Since the load can be carried in the rear, greater rear wheel traction is attained, and front-wheel pressure diminished to facilitate steering. Whenever the loading bucket is lifted 5 ft. off the ground, the bucket assumes a vertical position which it maintains during its swing over the tractor to the front dumping position. The entire operation of digging and loading is further simplified due to the fact that the operator need operate only two controls.

Among the accessories available for the Strait-Line are a combination bulldozer and angledozer, which can be used without removing the bucket from the loader; a double-end load-spotting crane; and six different loading buckets for various operations.



STEEL GRATING HIGHWAY CROSSING

THE Morrison Railway Supply Corporation, Buffalo, N. Y., is now manufacturing the Condon Steel Grating Crossing, formerly produced by Canisteo Industries. This highway crossing which, except for timber guards on each side of the track rails, is entirely of steel construction from one approach to the other, is comprised of a wearing surface of steel grating sections supported on a steel underframe. A feature of this design is that the crossing in no way interferes with normal drainage, since no part of the decking or its supporting underframe is in contact with the ballast.

When surfacing is necessary, the proper sections of decking may be removed by unbolting and lifting them out by hand and then proceeding to tamp the track. For heavier work, such as renewing ties or cleaning ballast, both the decking and the underframe may be removed and replaced later.

The cost of snow removal is reported to be minimized by the fact that much of the snow, except in the flangeways, either falls through the openings in the gratings or is forced through them. The grating surface also provides excellent traction for highway vehicles.

PRESERVATIVE AND WATERPROOFING AGENT

THE Lehon Company, Chicago, has announced the availability of Mule-Hide Dri-Seal, a non-toxic, ready-mixed solution adaptable to both masonry and wood structures. Dri-Seal is a colorless silicon base penetrant which enters the surface pores of the cellular structure of the material treated, preventing the entrance of moisture. This compound is made in three formulas.

Dri-Seal for masonry becomes chemically, rather than mechanically, bonded to the surface being treated, and thus, the manufacturer claims, will not wash off, flake, or otherwise lose its effectiveness from weather exposure. Since it does not allow moisture penetration, buildings and structures so treated will remain clean because dirt-laden rain cannot penetrate. In addition, the manufacturer recommends Dri-Seal for application on asbestos and asbestos-compound surfaces, claiming it will keep such surfaces free from stains and discoloration.

Dri-Seal for wood is also colorless and non-toxic and can be applied by dipping, brushing or spraying. It is said that Dri-Seal for wood contains six times the minimum amount of fungicide necessary to combat fungus, mildew and termite damage. A special formula (not colorless) is also available for conditions of extreme moisture or acid conditions, such as stock pens, fence posts and certain industrial conditions.

LIGHTWEIGHT AIR DRILL

TWO DRILLS permitting one-hand operation in overhead or "awkward spot" jobs are now being marketed by the Chicago Pneumatic Tool Company, New York. One unit, known as the CP-9 Handril, weighs only 7½ lb. and is intended for drilling holes up to 1¼ in. in diameter. It is equipped with an Ajax "quick change" chuck which speeds up drill changes and holds rotating drill steels, non-rotating chisels, and moil points,

while adapters are available for "A" and "B" taper-shank star drills. The other unit, known as the CP-14 Handril, weighs 14 lb. and is for drilling holes up to 1¾ in.

Air consumption for both units is reported to be relatively low. These tools are said to be especially desirable for speeding up machinery installation and anchoring jobs, as well as for light demolition, chipping and scaling operations on bridge and building work.

NEW TRACTOR SHOVEL

THE Model HR Payloader, latest development of the Frank G. Hough Company, Libertyville, Ill., can be employed on all types of excavating, grading, building and construction jobs. Some of the features of this unit are: A 4-wheel drive with full-reversing transmission providing 4 speeds in each direction; A 1-cu. yd. capacity hydraulically-controlled bucket; rear-wheel steering with power booster; powerful hydraulic brakes; unusual operator visibility; and large pneumatic tires. This machine, available with either diesel or gasoline power, has a total weight of 12,400 lb., a large portion of which can be applied to the bucket cutting edge to facilitate penetration in hard digging and below-grade excavation.

ELECTRIC CHAIN SAW

A NEW type electric hand chain saw, known as Model 11E18 "Smooth-Cut" chain saw, has been designed by the Mall Tool Company, Chicago, for cutting heavy building timbers that are too large for circular saws and that ordinarily must be sawed or chipped by tedious hand methods. Weighing under 20 lb., it is light enough for one-hand use, although a

(Cont'd. on next page)

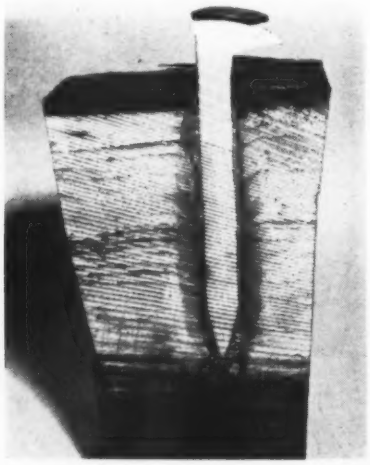
For additional information on any of the products described on these pages, use postcards, page 211.

helper's handle can also be attached so that two men may saw sharp angles with ease.

The new saw has a thin chain guide and a narrow special-toothed chain for producing extremely smooth and precise finish cuts. The cutting bar is 18 in. long. Models are available for either 115 or 230-volt a.c.-d.c. current.

SPIKE-HOLE REHABILITATOR

FOR use in those spike holes that have become enlarged in ties so that they no longer hold the spikes or permit maintaining proper gage, The Master Builders Company, Cleveland, Ohio, has produced a material known as Spike-Grip. This material, similar to another of its products known as Rust Joint Iron, is ground iron combined with chemicals and is applied in dry form into the enlarged spike hole in lieu of a tie plug. Water is then added and the track spike is driven. The driving of the spike forces the Spike-Grip against the sidewalls of



the hole while the water swells the iron, thus increasing the spike holding power.

Approximately from three to five ounces of Spike-Grip are required on the average for each spike hole. The material is available in 100-lb. drums or cloth bags. The company has perfected a simple dispenser for applying Spike-Grip in the spike holes and suggests that it can be made very easily in railroad shops.

TIE INSERTER AND REMOVER

TWO new tools, designed to facilitate tie-renewal work, have just been announced by Templeton, Kenly & Co., Chicago. One is for removing old ties and the other is a companion tool—a tie replacer for inserting new ones. Each tool consists essentially of a manually-operated jacking mechanism which, when hooked to a rail, exerts horizontal power through a rack bar.

The manufacturer claims that tie-handling with these devices is twice as fast as with pick and tongs, in addition to being considerably safer. It is also said that, with these tools, one-fourth of the amount of ballast is handled as compared with hand methods.

Operation of the tie remover calls for only three steps: (1) Tie plates are removed; (2) ballast is loosened at both ends of the tie and removed at the pushing end to a depth flush with the bottom of the tie; and (3) the tie remover's rail grip is hooked over the top of the rail and the pushing head of the rack bar is placed against the tie end.

The tie replacer is used by placing the new tie partly under the first rail in the cavity left by the old tie. A hook on the end of the rack bar is placed over the rail and the new tie is pushed into place by the tie replacer housing traveling along the rack bar.

Portability of both devices is made easy by a roller on the end of each unit which fits over the rail so that the unit can be rolled along the rail top. The tie remover, known as Simplex No. 80, weighs 62 lb. and has an overall length of 98 in. with a travel of 80½ in. The tie replacer, known as Simplex No. 82, weighs 60 lb. and has an overall length of 116 in., with a travel of 86 in.

(*Continued on page* 326)

"I LIKE TO DO BUSINESS WITH YOU PEOPLE" . . . "*You Know Your Business*"

Coming from the Chief Engineer of a railroad known for its exceptionally fine track, this was really a very nice compliment.

Any engineer likes to see a contractor with an award in hand, go about the work with an assurance and a positiveness that speaks of good equipment, good organization and capable personnel.

So, frequently when a contract is awarded to us a second year, the engineer in charge will say—"The two men who handled our job last year were fine boys and they did a bang up job—we would like to see them with us again this year."

And they get the men that they have a preference for.

It is this frame of mind on the part of so many railroad engineers who have observed our work for a long period of years, that permits us each year to receive awards for weed and brush control work from a long list of large and small railroads.

If your control program has not met with your full approval, or if cost per mile seems excessive, why not exchange information with us on this important yearly problem. We will cooperate in every way to assure you the benefits and economy that such work should contribute.

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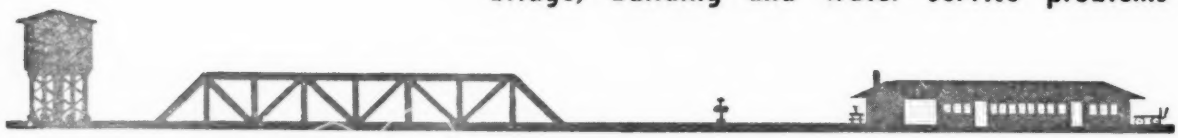
PLANTS IN NUMEROUS RAILROAD CENTERS

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



What About "Frozen" Joint Bars?

At what time, if any, should "frozen" joint bars be loosened? To what extent can it be done when bolts are being tightened out-of-face? Explain.

"Freeze" Joints on Purpose

By Lee Spencer
Track Supervisor (Retired), Long Island, Phoenix, Arizona

From the exact wording of this question, I suspect it was thought that answers in general would follow the usual supposition that all frozen joints are decidedly harmful and must be corrected. However, history has shown that, in time, some suppositions become superstitions which are later proved false. Perhaps this is the time to query: Are there superstitions about frozen joints that are questionable, or even false?

If this question opens the door to new thinking and thereby creates a means of finding a true solution to the whole joint problem, it may well be the most momentous question ever raised in the What's the Answer columns. An adequate solution could revolutionize track maintenance practices and reduce their cost just as much as diesel locomotives upset traditional operating methods and altered the face of motive-power servicing facilities.

On the basis of my own experience, strengthened by discussions with practical trackmen right out on the track where joints can be observed, I think frozen joints can be divided into two classes, "good" and "no good." Joints that are frozen with minimum gaps between the ends of the rails, I call "good" joints. Those that are frozen with wide gaps are "no good." Why not utilize the first and eliminate the latter? Why not institute a program of correction to that end? Why wait? Perhaps a solution can be found that will eliminate all future bolt-tightening programs.

From long observation of accidental, "good" frozen joints such as we can find on everyone's railroad, I believe that we can gain many benefits by devising a practicable way of freezing joints on purpose. By thus eliminating the joint effect, the M/W ratio on most railroads could be lowered well below the 10-per cent level and a much stronger and better-riding track structure would result.

Why do my observations lead to a belief that freezing joints on purpose would be good? First, there are no loose bolts in such a joint. Second, there is no wear, either on the joint bars or on the contact surfaces of the rails, because there has been no movement between those parts. Furthermore, these facts suggest that when, or if, joints could be frozen on purpose, there should accrue even greater benefits, such as no batter, no chipping, nor any loss in bolt tension. The best part of this method of eliminating the effect of the joint is that it can be applied at any place or any time not only to new rail, but also to rail now in track.

A century of track maintenance has shown that extraordinary measures and great expense are required to prevent joints from freezing. Can we not devise a way to take advantage of that natural fact and put it to work? If such a plan can be developed through study, we can take our present track materials, all of which are time tested, re-

(*Continued on page* 302)

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the June Issue

1. In mountain territories where it is necessary for equipment to sand rails, what methods are most effective in minimizing the fouling of the ballast by the sand? Explain.

2. In view of the current steel shortage, to what extent can wood be used as a substitute in the construction of railway buildings? Explain.

3. In what ways do checks affect the usefulness of ties? How does the size or type of check influence such usefulness? What determines those which are harmful and those which are not?

4. In the light of recent experience what are the weaknesses, if any, of steel made in conformity to specification A 7 of the American Society for Testing Materials? To what extent might these weaknesses affect the use of this steel in railway bridges? Explain.

5. What new methods involving the use of chemicals have been developed for stabilizing soils. What are the possibilities of their use on the railways? Explain.

6. In handling diesel fuel oil, what are the relative merits of combined water removal and filtration equipment as compared with pressure-type renewable cartridge filters?

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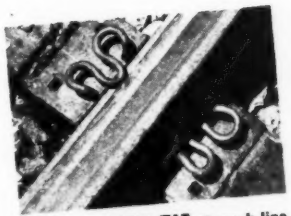

DRIVES INTO TIE through line spike holes of standard tie plate. No maintenance . . . because it won't work out!

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Prevents creep in either direction.

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arrange their assembly slightly and thereby create a track structure which will do what we want it to do, eliminating the faults and retaining the benefits. One thing is certain, we are never going to regain control over ever-rising M/W expenses simply by continuing to build our track structure exactly as we have always built it. Nor can I subscribe to the theories of those who say such control will result from simply installing heavier and heavier rail, for, with all the same faults, it too must fail in the same way.

Should we be satisfied to let old suppositions keep us in the same rut? Ten years ago diesel locomotives were scoffed at, in some quarters, because steam-power men were satisfied. Should they have been? Are the benefits of "good" frozen joints being overlooked because maintenance-of-way men are contented? Or aren't the possible benefits sufficiently challenging to be worth the effort and expense of study? I think they are.

Tighten Bolts in Spring

By H. S. Chandler
General Supervisor of Track, Chesapeake & Ohio, Richmond, Va.

Bolts should be tightened out-of-face after the weather warms up in the spring. At that time, oil should be sprayed behind all joint bars with a pressure gun after which bolting machines should be used to tighten the bolts. In performing these operations, the bolts should first be loosened about ¼ in.; then both bars should be hit with a spike maul. After this the bolts should be tightened to the correct tension.

This work should always be done in warm weather—the hotter the better. Doing the work at this time allows the rail ends to close up and permits expansion forces to dissipate themselves. Having adjusted expansion gaps in the rail in this manner one should be able to work track all through the summer season without fear of buckled track. However, if some of the rail ends do not close up at the time the bolts are tightened, a hand wrench should be used to slacken the bolts in any joints found standing open in track that is being worked in subsequent hot weather. This will allow the wide joints to close up and minimize expansion troubles.

Frozen Bars Not Troublesome

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Where enough rail anchors are used to keep rails from creeping and spring devices are applied to the bolts to keep them at the right tension at all times, no serious trouble will be caused by "frozen" joint bars.

It is good practice, regardless of whether joints are "frozen," or not, to adjust rails for expansion on the hottest days of the summer season by slacking off anchors where necessary, loosening bolts at wide joints and by jarring the joint bars, thereby causing the rails to close up. Then the loosened bolts should be tightened and the rail anchors reset.

This procedure may be found to be necessary on tangents and on the low sides of curves, but seldom on the high sides of curves because the rails there are usually tight together.

Before the advent of cold weather, all bolts, especially those loosened during the summer, should be tightened with a bolt-tightening machine to bring them to uniform tension, and rail anchors that need it should be reset.

Loosen Bars, Apply Oil

By Section Foreman

Bolts at frozen joints should be loosened enough to apply a compound of corrosion-preventive oil or grease to the fishing surfaces of the rail and joint bars. Regular maintenance of frozen joints can best be performed in the early fall but, if necessary, it can be done anytime except in the middle of the winter when oil and grease do not flow well enough to lubricate the fishing surfaces properly.

Frozen joints can be serviced best when the bolts are tightened out of face. Doing it at this time saves duplication of work. In fact, I do not believe bolts should be tightened out of face unless all fishing surfaces are properly lubricated at the same time.

In many cases, frozen joints are caused by tight bolts without lubrication of the fishing surfaces of the joint bars. Generally, we have more difficulty with frozen joints during the winter months because sudden changes of the weather cause rails to contract or expand, resulting in broken bolts, open joints, damaged rail ends and finally signal failures.

In advance of well-programmed, major surfacing and lining work it would be a good thing to loosen bolts and oil frozen joints, thereby allowing the rails to adjust themselves before heavy work is started. Better, more-uniform track will result.

How to Straighten Tilted Piers

Is it practicable to straighten a pier or abutment that has developed a slight tilt? If so, what methods can be used? If not, explain.

Practicable and Economical

By Raymond Patterson
Regional Vice-President, Intrusion-Prepakt, Inc., Chicago

Several methods have been used whereby piers and abutments have been straightened by practical and economical means. Our usual practice is first to determine definitely the cause of the tilting. Field conditions are always checked carefully with all existing plans, and subsoil explorations are usually carried out to determine the condition of the footings and the nature of the existing foundation materials.

The next step is to correct or improve the bearing capacity of any faulty foundation materials. We accomplish this very economically by introducing cementing materials into the low-bearing soil areas by a special method. Where conditions are such that large quantities of cementing materials may be dispersed by lateral flow beyond the limits of the footing, a curtain wall of augered-in-place grout piling may be placed around the structure. After this curtain piling is in place, the weak ma-

(*Continued on page* 304)

ALADDIN LUBRICATOR

$178.00 delivered

Only one moving part:

The "Aladdin" has no pumps or valves. A spring-loaded piston, the *only* moving part, descends in a cylinder under vibration from traffic—and delivers the required amount of standard grease *automatically* to the running side of the rail.

One-man installation:

No track alteration, rail drilling or gauge widening is required to install the "Aladdin". And since it weighs only 50 pounds—it can be handled and installed by one man *in less than half an hour.*

Proved performance:

Today, thousands of "Aladdin" Lubricators are in use on main lines...in yards...under one or two-way traffic...in all climates. The "Aladdin's" low cost means you can now economically specify a lubricator for every rail wear location. Why not check *your* lubricator requirements today? Write for Bulletin A.

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terials under the footing are strengthened by the injection of special cement grout. In addition to confining the grout, the piling also protects the foundation materials from erosion by flowing water. Steel sheet piling may be substituted for the curtain piling provided the sheet piling can be driven without further endangering the stability of the structure.

Cast-in-place piling may also be used alone to increase the structural stability of the structure. Such piling may be of the friction or bearing types or be a combination of both. For the most part, it is placed outside of, but adjacent to, the limits of the footing. Later a new footing addition is built to extend the existing structure over the piling to transfer some of the loading to them.

With the foundation materials stabilized and strengthened as outlined in the first of the two methods mentioned above, structures have been straightened and plumbed by forcing our cementing materials into other portions of the underlying strata with sufficient pressure to lift the low end of the structure. This method is undertaken with long-experienced personnel and special equipment and is used only in certain subsoil formations.

Another practical method of straightening a structure is to alter its outline without actually attempting to raise all low portions completely. Upon stabilizing the foundation, the straightening is accomplished by encasing the structure in concrete and may or may not involve the removal of portions which overhang on the low side. The addition is often necessary because the bridge shoes have been pulled out and loading is uneven.

This method of reconstruction is especially practical using our type of concrete, two important characteristics of which are low shrinkage and perfect bond to the existing concrete. Temperature reinforcement is used where necessary. If the existing structure is cracked, or over-stressed, it may be dowelled together with prestressed or preloaded steel reinforcement.

In almost all stabilization, straightening and underpinning work, the structures usually require some other repair such as the removal of deteriorated concrete and its replacement, or the grouting of interior voids and cracks. The result is a revitalized structure having greater strength and load-carrying capacity than ever before, with all of the work being done without traffic hindrance from restrictive train orders.

If Tilted Much, Remove

By S. F. Grear
Assistant Engineer of Bridges, Illinois Central, Chicago

We have never tried to straighten a tilted pier or abutment, and I do not believe I would attempt such an operation. An abutment or pier with a slight tilt might be underpinned to prevent further settlement, but if tilted sufficiently to require straightening, it should be removed and rebuilt.

About 30 years ago, an abutment slid at the base, leaving it tilted back toward the fill. The pressure was taken off the abutment by the construction of a trestle approach to permit excavation of the fill behind the abutment. This abutment was left in the tilted position, and has remained there because the vertical load is still centered near the center of the foundation.

Railway Uses for Precast Concrete Slabs

What are the advantages of using precast concrete slabs for walls and partitions in railway buildings? Disadvantages? Explain.

Cost Less and Go Up Faster

By L. E. Peyser
Architect, Southern Pacific, San Francisco, Cal.

There are numerous advantages in the use of precast concrete slabs for the construction of railway buildings, the most important of which are economies in first cost and speed in completion.

A very considerable part of the cost of concrete construction of the conventional type is due to the elaborate formwork necessary and in connection with the actual elevating and placing of the concrete within the forms. Any method of reducing the amount of formwork is bound to be reflected as a reduction in the ultimate cost of the structure. It is mainly by reason of this simplification that precast construction is economical.

The most usual method of forming concrete for precast construction is by means of edge rather than face forms, thus greatly reducing the amount of form work and entirely eliminating costly bracing and tieing of the form structure and of scaffolding. Further reduction of cost results from the erection on a level, prepared, horizontal surface rather than from scaffolding, as well as in the placement of reinforcing steel and in pouring concrete. In structures of considerable extent, forms may be reused many times because they are not subject to distortion or damage.

These economies would apply equally to the construction of partitions within a building if portability is not a consideration, but where a degree of fire resistance is desirable. Partitions of precast construction necessarily cost more than other types, but in many areas would cost less than hollow tile or masonry block walls. Where partitions might be subject to change, it is doubtful that the cost could be considered as economical.

A further advantage is the time factor, because experience indicates that a structure can be enclosed and completed in less time by precasting than by any other method resulting in a comparable building.

It is believed that this method is particularly adapted to simple types of design and would not be suitable to a structure where complicated formwork would be required. A good appearance should be obtained by a judicious sizing of wall panels outlined by a simple moulding placed in the forms. It is important to keep in mind the desirability of simplicity in forms, reducing the number of forms to a minimum and of as large an area as may be practicable to handle with available equipment.

Details of construction must be carefully developed, for there is little chance of adjustment after panels are set. Although precasting

(*Continued on page* 306)

FABCO TIE PADS *On Bridges*

INCREASE LIFE OF COSTLY BRIDGE TIES BY REDUCING MECHANICAL WEAR

3 Outstanding Advantages on Bridges

- FABCO TIE PADS greatly extend the life of costly Bridge Ties by eliminating plate cutting.
- FABCO TIE PADS have an extremely low initial cost compared with expensive bridge ties.
- FABCO TIE PADS have a record of long life in actual service.

Reduce Maintenance Costs

FABCO Tie Pads have withstood in actual service severe modern track conditions — high speeds, extremes of temperature, moisture, brine, sand. Their resiliency assures tight spikes and permanent cushioning of track. FABCO Tie Pads help maintain line and surface; permit use of smaller tie plates; compensate uneven surfaces . . . all making for low maintenance costs and low pad cost.

In view of the costs of ties and labor it is of the utmost importance to railroads to obtain maximum tie life. Over 16 years of practical experience in the use of our resilient pads in track applications has made us familiar with the essential requirements of track maintenance.

FABCO Tie Pads are recommended for use anywhere in open track. The most substantial savings can be effected on curves, bridges, insulated rail joints, switches, station tracks, and station approach tracks. These are the points of most acute tie wear, high tie costs and greatest re-gauging problems.

Ideally suited to engineering and construction requirements of maintenance of way.

It Pays to Specify **FABCO TIE PADS** *Made by the Makers of*

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FABCO TIE PADS • Used on Curves, Bridges, Insulated Rail Joints, Switches, Station Tracks, Station Approach Tracks, Open Track

does not require great skill in workmanship, it does require care to avoid loss of panels because of honey-combing or fractures at the edges so that a weather-tight structure may be assured.

Many Factors Involved

By John F. Hendrikson
Assistant Architect, St. Louis-San Francisco, Springfield, Mo.

Inasmuch as I have had no experience in either the design or erection of precast concrete slabs in building work, my opinions have been formed mostly from observing this type of construction used in buildings other than those of railways.

Those observations indicate precast concrete slabs have seven basic advantages. (1) From a proper lay-out design, slabs may be duplicated throughout the entire building and will require a relatively small amount of lumber for forms which can be reused many times. (2) Labor costs for forming are held to the minimum because wall ties are not required and because it is unnecessary to brace forms to prevent their bulging or to assure correct wall alinement. (3) Walls (without honey-comb) can be precast thinner than standard "poured-in-place" designs because the concrete can be placed from the "open side" of the slab with the assurance that all reinforcement is properly located. (4) Precast walls have a uniform texture and do not require rubbing to remove form marks. (5) Through proper design based on the availability of railway equipment to handle and transport completed slabs, it is possible to develop the processing of "packaged" units covering small buildings. The pouring and curing of the precast slabs could be handled at a central location. They could then be shipped and erected at building sites in a manner similar to the erection of the "knock-down" type of steel building. (6) The precast method permits the use of thin slabs which require only small amounts of concrete. Finally (7), by adding cement pigments, permanent-colored slabs conforming to the railway's "standard" color may be cast at a small additional cost, thereby eliminating future maintenance.

On the other hand, precast slabs appear to have six disadvantages. (1) More time and thought are required in designing the structural requirements of the slab not only for its use in the building, but also to resist the strains and impacts of moving and tilting it. (2) Because of the lack of available information and handbooks covering the precast method, the design must be made by experienced designers whose time is more valuable to the railroad on other work. Building plans following more common practices, especially those of small buildings, do not require the services of these men. (3) It is the usual practice on small buildings to design bearing walls. In tilt-up slabs, this function of the wall is generally lost because of its lightweight construction. If it is not lost, the slabs will be so thick and heavy as not to justify the method. (4) It must be known and decided in advance of the plan making just what equipment will be available to be used in erection. Complete plans and instructions for erection must be kept on the job to avoid damage to the slabs. (5) The time required for curing the slabs must be taken into consideration. If the time of completion is critical, this curing time may be the deciding factor in favor of standard methods, especially for small buildings. (6) There is a shortage of men experienced in this method of construction.

Where Use Hardwood and Softwood Ties?

Is it desirable to install treated hardwood and softwood ties indiscriminately in the same track? If so, explain. If not, why?

Not The Problem It Was

By W. J. Burton
Assistant to Chief Engineer, Missouri Pacific, St. Louis, Mo.

In the days when tie plates were small and thin, and they cut into ties badly, this question was of much greater importance. Modern, strong and large tie plates, well fastened to the ties, have greatly reduced the relative inferiority of "softwood" ties.

Even so, where it is possible at a very moderate additional cost to use the softwood ties separately, it is probably wise to do so. The separation originates, anyhow, at the treating plant, and it may be entirely feasible to maintain it in application to the track.

The practice, followed by certain railroads which have a limited supply of hardwood ties, of reserving them for curves is probably justified even with modern tie plates, because the "softwood" ties available to them are likely to be quite coarse-grained and not too good as spike holders.

While pine is usually grouped with the softwoods, dense pine may be fully as hard as some of the hardwoods. If ties are bought under a density specification, there may be some question as to whether separation in use can be justified. It must be remembered that individual ties vary greatly from the average hardness and strength values given in handbook tables.

To sum up, if modern, well-designed and securely fastened tie plates are in use, a good look should be taken before spending very much money to keep the softwood ties together in track. Local conditions should determine.

Don't Use Them Together

By L. L. Adams
Chief Engineer, Louisville & Nashville, Louisville, Ky.

It is important to have equal bearing on all ties. Hardwood ties offer more resistance to plate cutting than softwood ties and, where both kinds are used indiscriminately in the same track, it is only a short time before the hardwood ties are carrying more of the load than the softwood ties.

In addition to the softwood ties, besides being susceptible to more rapid "plate-cutting," also depress more under load than the hardwood ties, thereby shifting an undue amount of load to the harder ties.

For these reasons it is very undesirable to install treated hardwood and softwood ties indiscriminately in the same track.

Rail Wear Versus Well-Lubricated Cars

To what extent, if any, would better lubrication of center plates and side bearings of cars tend to minimize wear on the rails and wheel flanges? What other benefits might accrue? Explain.

Extent of Benefits Vague

By G. R. Andersen
Assistant Chief Mechanical Officer, Chicago & North Western, Chicago

When the word "better" is used in this question, the inference is that there is a question concerning the quality of lubrication. As a matter of fact, very little attention is paid by railroads to the lubricating of center plates and side bearings under freight cars, particularly the latter. Rule 60 (c) of the current AAR Code of Rules provides that, "When car is on repair track and is jacked for repairs, the center plate must be lubricated on the end (or ends) jacked, for which charge may be made versus car owner per Item 172 of Rule 101." Consequently, in lieu of any periodic lubricating order, the only time that center plates and side bearings are lubricated is when a car is on a repair track and jacked up for other repairs, or when the car is receiving cycle or heavy repairs in its home shop. Therefore, in most instances, a long period of time elapses between lubrications of center plates and side bearings.

Insofar as passenger care are concerned, I am certain that on most railroads there are definite instructions regarding the lubricating of side bearings and center plates. I am just as sure that this matter is watched closely, because dry center plates or side bearings cause a squeaky or hard-riding condition which is very undesirable, principally because it results in serious passenger complaints.

To what extent the proper periodical lubricating of side bearings and center plates on freight cars, particularly the latter, would minimize wear on rails or wheel flanges is hard to say. However, it is self-evident that a well lubricated center plate would greatly reduce friction between car body and

(*Continued on page* 308)

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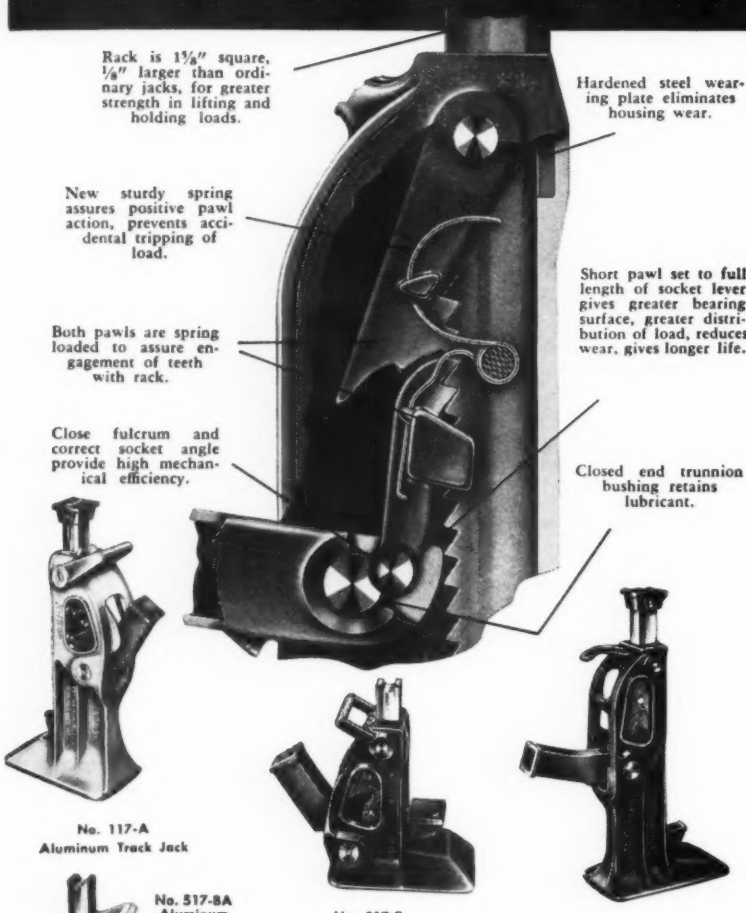
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truck, and would allow for freer truck motion, which in turn would greatly reduce friction and resultant wear on wheel flanges and rail, particularly on curves. Further, lubrication of center plates would greatly decrease center-pla e wear and breakage and in my opinion would result in a better-riding car in that the car body would not be subjected to undesired action such as is set up by friction in the cases where center plates are dry and devoid of any type of lubricant.

Justification a Moot Point

By G. M. O'Rourke
Assistant Engineer Maintenance of Way, Illinois Central, Chicago

The following is one of the rules covering the Interchange of Traffic: "When car is on repair track and is jacked for repairs, the center plate must be lubricated on end (or ends) jacked, for which charge may be made versus car owner per Item 172 of Rule 101." Except for instances covered by this rule, we believe that center plates are lubricated with some degree of regularity only on locomotives and passenger cars. There appears to be no uniform nor general practice with regard to lubricating side bearings.

It is reasonable to assume that lubrication of contact points on equipment, such as center plates and side bearings of cars, will make the car trucks more flexible, allowing them to go around curves with less friction, thereby reducing wear on the rail and wheel flanges, and probably making it possible to increase the tons per train.

Rail-flange lubricators were developed to do the same things and have proved to be effective, beneficial and worth the investment, and their use is spreading. Whether the benefits to be derived from lubricating center plates and side bearings of cars would be sufficient

to warrant such extraordinary work is a moot question.

With reference to that part of the question relative to other benefits which might accrue, I must say that I know of none. Perhaps the entire question should be placed before the railroad mechanical engineers.

Might Be Worth Study

By H. Charles Koch
Roadmaster, Belt Railway of Chicago

I don't believe this question can be answered, so far as wear on rail is concerned, without making extensive field tests on track, both tangent and curved. No doubt adequate lubrication of center plates and side bearings will allow car trucks to slue more freely and therefore lessen friction wear on the rail. We know from actual tests and experience that lubricated rail on curves has a longer service life than unlubricated rail on the same curves. These tests were easy to make.

It would be impossible to determine in normal operations the number of cars that were properly lubricated without making an inspection of all cars for this particular detail. Such inspection would be expensive and interfere with and delay normal operations.

As to wear on wheel flanges, it would seem logical to expect less wear when center plates and side bearings are sufficiently lubricated. Testing wear on car wheels should be less involved than testing wear on rail. Cars of the same type and weight and with the same net tonnage can be operated over the same track at the same time of year, possibly in the same train, where speed and other conditions would be equal. If some of these cars were adequately lubricated and others lubricated to lesser extents down to the minimum of dry center plates and side bearings, after a certain period of operation a detail check of the wheel flanges would determine the relative amount of wheel-flange wear on the various cars. There must be recognized benefits as car departments have orders from railroad associations to lubricate center plates and side bearings whenever it is necessary to jack up cars.

One benefit not primarily connected with rail or wheel-flange

(*Continued on page* 310)

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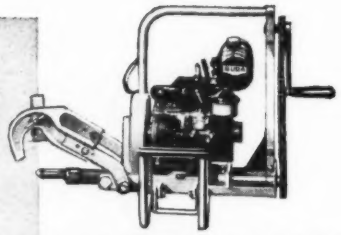

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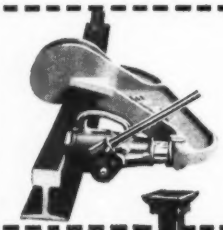

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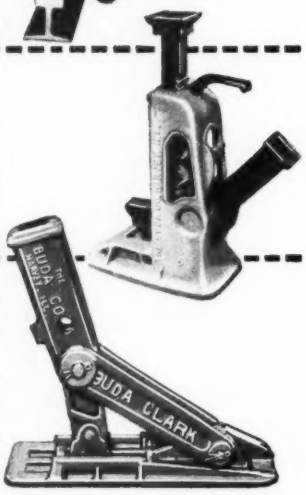

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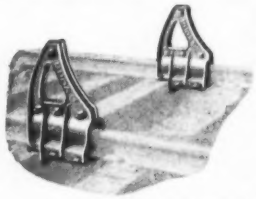

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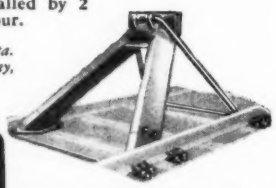

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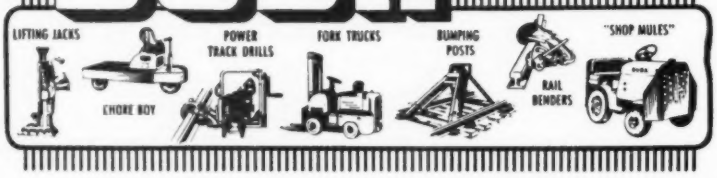


wear is the easier sluing of trucks of cars that are adequately lubricated. This is especially noticeable when operating heavy loaded cars over tracks with sharp curvature. Derailments have been traced to trucks that did not slue properly because of lack of lubrication, especially when being moved through the turnout side of a switch.

Treat Diesel Water By Plant or by Hand

How does plant control of water treatment for diesels compare in effectiveness and economy with manual applications of chemicals? Explain.

Each Has Its Place

By A. G. Tompkins
Supervisor of Water Treatment, Baltimore & Ohio, Baltimore, Md.

Water serves two purposes on diesel locomotives: (1) To generate steam for train heating; and (2) for engine cooling. In the first instance water is evaporated, leaving insoluble deposits which concentrate and form scale and sludge. In the second case, no evaporation takes place and the formation of scale and sludge is slight, the problem being chiefly one of corrosion. Consideration should be given then to the different types of treatment required in each case.

Steam Generators—Manual application of chemicals to the steam generator water may reduce hardness somewhat if it is in the form of sulfate. Nothing is removed from the water, however, and the resulting sludge will be proportional to the initial hardness of the feedwater. Plant-controlled treatment may be designed to remove practically all hardness before water enters the boiler leaving insignificant amounts of sludge. Years of experience with water treatment for steam locomotives has proven the worth of plant control as compared with hand dosing, and while the writer has no actual figures to prove the point it is believed by some that hand application does only about a 50 per cent job.

Water requirements for steam generators of the flash type are

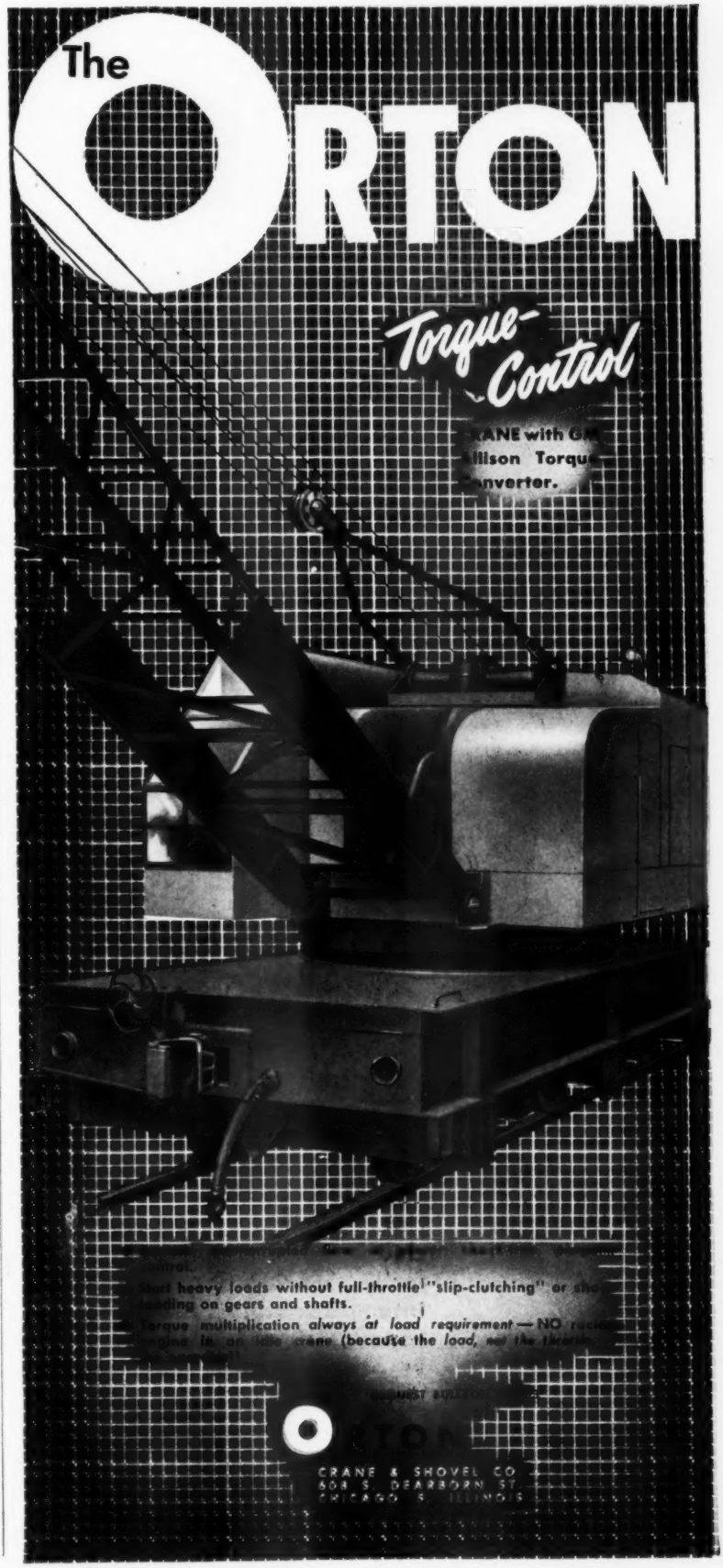
more severe than for steam locomotives. This is because of the higher evaporation rate per square foot of heating surface, resulting in excessive deposits of scale in the coils. Needless to say, if the manual application of chemicals is only 50 per cent efficient for steam locomotives, the effectiveness is undoubtedly less for the flash boiler. Since high quality water is needed, demineralized or zeolite-treated water with controlled after-treatment is desirable for this purpose. Hardness is reduced to practically zero and sludge is minimized. It is thought by many that zeolite treatment with controlled caustic-soda after-treatment gives results equal to demineralized water and at less cost. Silica scale can be a problem with either unless special arrangements are made to remove it where raw-water silica content is high.

The advantages of zeolite or demineralized treatment over hand application include: (1) More efficient heat transfer, therefore better train heating and lower fuel consumption; (2) fewer acid washings of generator coils; (3) fewer plugged coils and failures; (4) longer coil life; and (5) greater availability of locomotives.

Cooling Systems—While low hardness, particularly the bicarbonate type, is desirable for cooling water it is not considered as essential as it is for the steam generator. Most city supplies are satisfactory provided corrosion inhibitors are used. These are usually alkaline chromates, and to date have proved superior to any other chemical tried. Minimum doses of about 0.4 oz. of sodium chromate per gallon of water give adequate protection, and small overdoses apparently do no harm. Most railroads are adding this compound manually with good results. The need for plant control in this case therefore seems unnecessary. To assure proper chromate strength at all times simple tests have been devised, and units are checked after each run, shop forces usually doing the testing. Close control over these tests has produced good results on most railroads without plant-controlled treatment.

Plant-controlled treatment for cooling water actually appears undesirable because of the toxicity of the chromates. Dissolving them externally in water and feeding them through a distribution system introduces a real element of danger because of the chance that the solution might possibly find its way into

(*Continued on page* 312)



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the drinking water system.

There are a number of chemicals less toxic in nature than chromates, which appear suitable for cooling-water treatment. These have one common weakness—there are no very rapid and reliable tests applicable to field control of their concentrations in the cooling systems of the locomotives. Because of the nature of the cooling systems and irregularity of adding water at various wayside locations, it is absolutely essential to determine treatment concentration tripwise and to adjust the treating chemical to optimum strength. This is a must. Chromate concentration can be accurately determined by any one in a couple of minutes on the locomotive without special apparatus. A specially impregnated blotter upon which a drop of the cooling water is placed and which develops a characteristic color proportional to the strength of the chromate appears to be the most effective method of testing cooling water for adequate treatment. Any other cooling-water treatment for diesel locomotives must be as easily checked and controlled if it is to be successful.

In many instances the cooling-water treatment and its control have determined the life of diesel engines and their accessories. Corrosion can destroy many of the parts, such as piping, heat exchangers, cylinder liners, and even the engine frame itself. Simple, fast and accurate control methods for efficient corrosion inhibitors are the answer to this problem.

Use Plant Control for Steam

By M. A. Hanson
Engineer of Research, Gulf, Mobile & Ohio, Bloomington, Ill.

Water treatment for diesel locomotives presents two distinctly different problems, namely, water treatment for the engine cooling systems and water treatment for the steam generators.

The use of proportioning equipment for feeding the chemicals used in the cooling systems has not been widely adopted. There are several reasons for this: (1) In leak-free diesel locomotives, additions of water to the cooling system are required only once every several days. (2) The consumption of chemicals in the cooling system is only slight, being lost mainly through leakage rather than con-

sumption. (3) In instances when a cooling system has been only partially treated but is full of water, it is necessary to drain and refill with properly treated water if proportioning equipment is used, but simple addition of chemicals can be made by manual application. (4) At smaller terminals operating only a few units per day, maintenance and operation of proportioning equipment requires more work and expense than hand dosing.

As long as the proper concentrations of chemicals are present in the cooling systems, corrosion protection will be satisfactory. The most frequent failure observed is the failure to test frequently enough the concentration of chemicals in the cooling system to make certain the desired concentrations are present. It is our opinion that tests should be made daily on road locomotives and at least twice per week on switching units. These tests can readily be made by terminal forces using either a simple spot-test especially developed for the purpose, or by one of the various instruments which measure electrical resistance, calibrated in terms of concentration.

Good results are being accomplished on various roads both by plant control and by manual application. It is questionable that the use of proportioning equipment for feeding cooling system chemicals can be justified except at major maintenance terminals.

The use of proportioning equipment for steam generator water conditioning is unquestionably justified at many locations. The problems encountered in this application are almost identical with those of conditioning water for steam locomotives except that a smaller volume of water is required. Water addition is required every two to three hours of capacity operation and the problem of control becomes a major one, if manual application is depended upon to secure satisfactory results. In addition, many water supplies are of such quality that external treatment is required to do a satisfactory job. It is therefore believed that a fixed installation of proportioning or softening equipment is required at most steam generator watering points.

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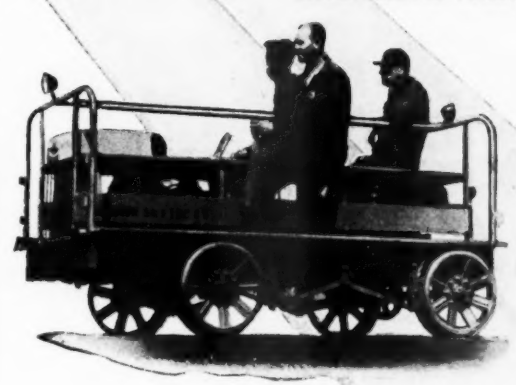

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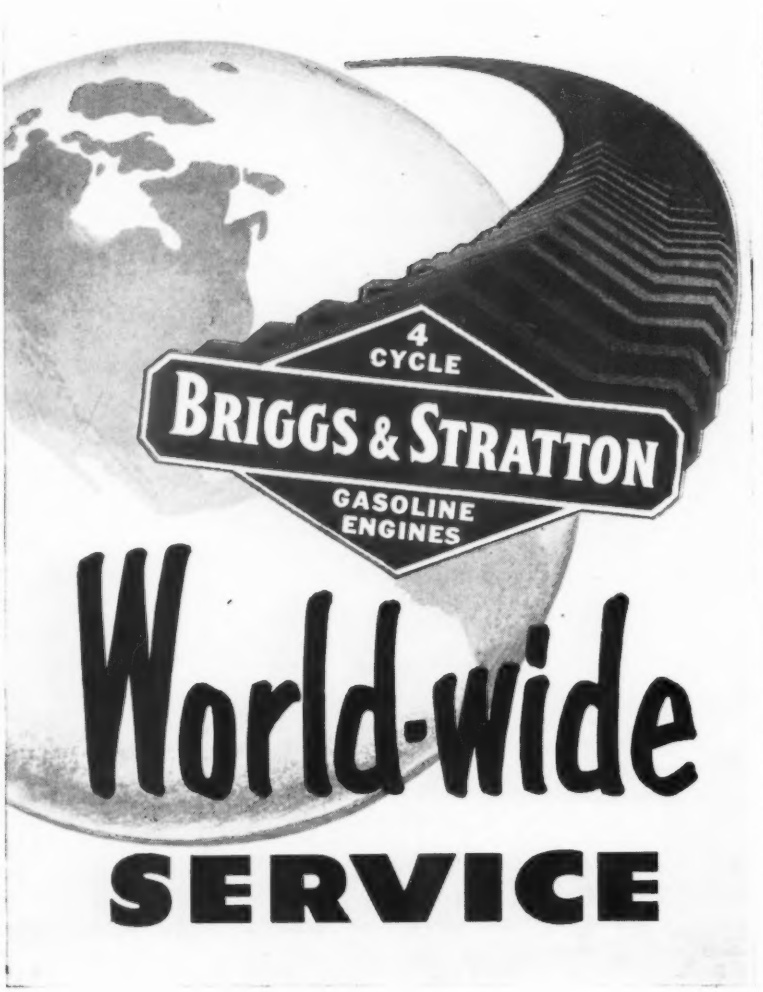

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THE MONTH'S NEWS

Railway Personnel

General

Robert B. Midiff, division engineer on the Southern at Asheville, N. C., has been appointed assistant superintendent at Knoxville, Tenn. **Gerald S. Williams,** supervisor of track at Laurel, Miss., has been advanced to assistant trainmaster at Rock Hill, S. C.

K. L. Moriarty, assistant general manager and former chief engineer of the Denver & Rio Grande Western, has been appointed general manager, with headquarters as before at Denver.

Mr. Moriarty was born on November 18, 1896, and began his railroad career in the engineering department of the Great Western. He entered Rio Grande service as division engineer at Gunnison, Colo., in July 1924. Later he served in

K. L. Moriarty

that position and as roadmaster and trainmaster at various points until 1939, when he was promoted to superintendent at Grand Junction, Colo., being transferred to Salt Lake City, Utah, in 1943. Mr. Moriarty was appointed assistant chief engineer in February 1946, chief engineer in January 1948, and assistant general manager in 1951.

John B. Kelly, supervisor of safety, system, for the Minneapolis, St. Paul, & Sault Ste. Marie (Soo Line), Minneapolis, Minn., has retired after 52 years of railroad service. Mr. Kelly, born at Milbank, S. D., December 30, 1882, received his higher education at the University of Arkansas, after which he entered the service of the St. Louis Southwestern as a roadmasters' clerk in 1899. He served as extra gang foreman on the Minneapolis & St. Louis from 1900 to 1902. From 1902 until 1909, Mr. Kelly was roadmaster on the Iowa Central at Monmouth, Ill., and Mason City, Iowa, after which he entered the service of the Soo Line as roadmaster. After serving in the latter capacity until 1919, he was appointed

assistant general roadmaster, system, which position he held until 1925. From 1925 until 1937 he was general roadmaster, system, and of the Duluth, South Shore & Atlantic, after which he served as general roadmaster of the Wisconsin Central until 1945. In the latter year, he

John B. Kelly

was appointed supervisor of safety, system, of the Soo Line, which position he held until his recent retirement on December 31, 1951. He has been a member of the Roadmasters and Maintenance of Way Association since 1915, and served as its president in 1927.

Alfred E. Perlman, general manager and former chief engineer of the Denver & Rio Grande Western, has been appointed executive vice-president, with headquarters as before at Denver, Colo. After graduating from Massachusetts Institute of Technology in 1923, Mr. Perlman started working for the Northern Pacific as a section hand. He held a number of jobs with that road and was named roadmaster in 1927. In 1934 he was loaned

Alfred E. Perlman

by the railroad to make various studies for the Reconstruction Finance Corporation. He returned to railroad service with the Chicago, Burlington & Quincy in 1935 as assistant engineer, maintenance of way. He went to the Rio Grande in 1936 as engineer, maintenance of way, and in 1941 became chief engineer. At

(*Cont'd on next page*)

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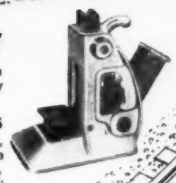

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Speeds surfacing, lining or tie plate removal. Capacity, 15 tons; lift, 5"; weight, only 28 lbs.

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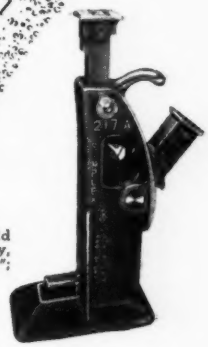

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Railway Personnel (Cont'd)

that time he was also appointed assistant to the president of the affiliated Denver & Salt Lake. In 1948 he was named general manager of the Rio Grande.

Engineering

R. L. Milner, special engineer on the Chesapeake & Ohio at Richmond, Va., has been appointed staff engineer at Huntington, W. Va.

W. R. Armstrong, chief engineer of the Nevada Northern, has been appointed superintendent and chief engineer, with headquarters at East Ely, Nev.

J. D. Free, senior assistant engineer on the Atlantic Coast Line at Atlanta, Ga., has been appointed division engineer of the Southern division, with headquarters at Jacksonville, Fla.

W. C. Moore, assistant division engineer on the Seaboard Air Line at Raleigh, N. C., has been transferred to Savannah, Ga. Mr. Moore has been succeeded at Raleigh by **Stanley Poole**, assistant division engineer at Jacksonville, Fla.

Alex Manson, assistant division engineer on the Louisville & Nashville at Ravenna, Ky., has been promoted to division engineer in charge of construction of a new yard at Radnor, Tenn. Mr. Manson's headquarters will be at Nashville, Tenn. He is succeeded by **Raymond W. Pember**, former assistant engineer in the special engineer's office at Louisville, Ky.

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William P. Shoemaker, formerly draftsman in the chief engineer's office at Louisville, has been promoted to assistant engineer on the Knoxville and Atlanta division at Knoxville, Tenn., succeeding **J. L. Chafin**, who has been promoted to assistant engineer, chief engineer's office, Louisville.

W. C. E. Robinson, whose promotion to assistant engineer maintenance of way, Eastern region, of the Canadian Pacific, was announced in the November issue, was born at Coldwater, Ont., on November 12, 1891. Upon completion of his education in 1908, he taught school for two years and then was employed by a contracting firm as chainman and rodman until May 1, 1912, when he became a rodman in the construction department of the Canadian Pacific, later serving as instrumentman. From 1915 until 1919, Mr. Robinson served overseas as a lieutenant in the Royal Artillery, and was wounded five times. On returning to the C.P.R.,

W. C. E. Robinson

he was again assigned to construction work and served as transitman, assistant engineer and resident engineer at various locations until 1928, when he became division engineer of the Bruce division, at Toronto. He later served as division engineer on the Trenton, Laurentian and London divisions and was also assigned, briefly, as industrial engineer at Montreal, Que. In 1943, Mr. Robinson was promoted to assistant district engineer of the Ontario district, and in 1948 was appointed district engineer, with headquarters as before at Toronto. He was serving in the latter capacity at the time of his recent advancement.

F. J. Haagen, whose retirement as division engineer of the Erie at Jersey City, N. J., was announced in the January issue, was born August 4, 1893, at Long Branch, N. J. He joined the Erie on December 16, 1918, as a transit man at Huntington, Ind., and the next year was transferred to Susquehanna, Pa. He subsequently served as head of corps at Marion, Ohio, assistant division engineer at Huntington, track supervisor at Marion, Ohio, and office engineer at Chicago, until February 15, 1927, when he was reappointed assistant division engineer at Huntington. On August 1, 1927, Mr. Haagen was named division engineer at

Rochester, N. Y., and on January 15, 1928, was appointed assistant division engineer at Buffalo, N. Y., which position he held until December 1, 1933, when he was named assistant division engineer with headquarters at Jersey City, N. J., the position he held at the time of his recent retirement.

L. M. Swoap, whose promotion to assistant engineer on the Erie at Jersey City, N. J., was announced in the January issue, entered the service of that road on January 23, 1918, as head of corps on the Marion division at Huntington, Ind. On July 21, 1918, he entered the service of the U. S. Army, returning to Huntington as transitman on April 1, 1919. Mr. Swoap subsequently served as head of corps on the Marion division, at Marion, Ohio, until April 16, 1927, when he was appointed assistant engineer on the Marion division. On March 1, 1928, he was appointed assistant division engineer

L. M. Swoap

of the Meadville division at Meadville, Pa., which position he held till December 31, 1931, when he was named head of corps of that division. On March 16, 1932, Mr. Swoap was appointed head of corps at Salamanca, N. Y., where he served until 1943, when he was transferred in that capacity to the Kent division at Marion. He was appointed office engineer of the Western district with headquarters at Youngstown, Ohio, on November 1, 1946, and construction supervisor at that location on November 1, 1950, which position he held until his recent promotion to assistant engineer.

R. J. Dettling, whose promotion to general fire prevention engineer on the Southern Pacific at San Francisco, was announced in the January issue, entered the service of that road on June 1, 1925 as a chainman. In August 1926 he became a rodman, which position he held until 1936 when he was appointed statistician in the office of the chief engineer. Mr. Dettling was promoted to assistant general fire inspector in 1942, and to assistant engineer of clearances in 1947, the latter being the position he held prior to his recent promotion.

Seaton N. Richardson, whose appointment as assistant division engineer on the

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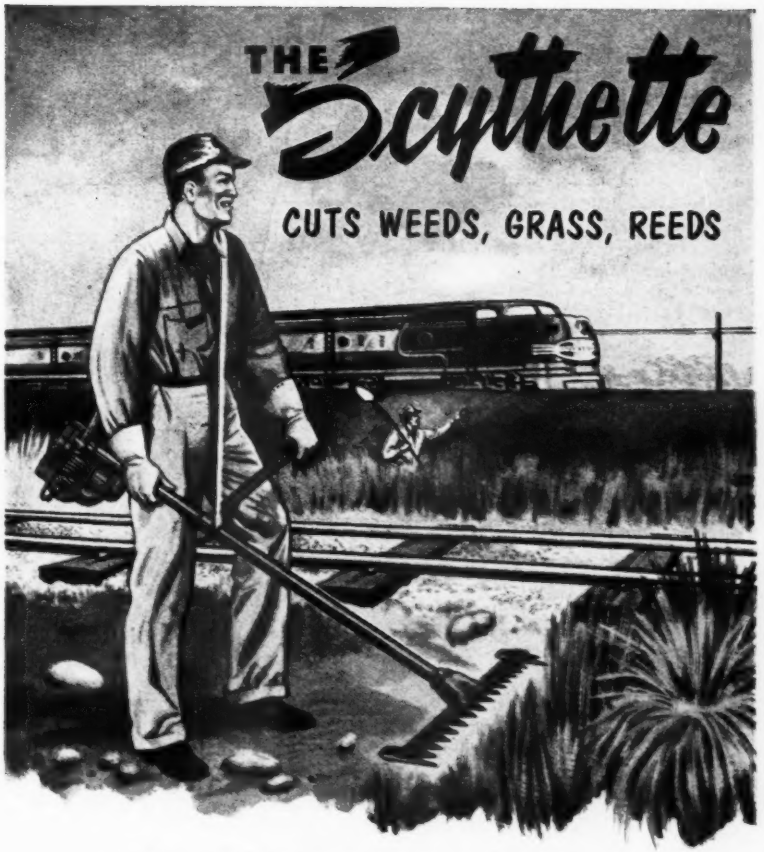

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Railway Personnel (Cont'd)

Seaboard Air Line at Jacksonville, Fla., was announced in the January issue, was born at Norfolk, Va., on October 12, 1924, and received a B.S. degree in civil engineering from North Carolina State College in June, 1949. He entered the service of the Seaboard on December 26 of that year as a student engineer at Atlanta, Ga. In March 1951, Mr. Richardson was appointed assistant to division engineer at Jacksonville, the position he held at the time of his recent promotion.

Paul J. Harnish, whose promotion to assistant division engineer on the Pennsylvania at Pittsburgh, Pa., was announced in the January issue, graduated from Pennsylvania State College in 1938 and entered the service of the Pennsylvania as assistant on the engineering corps, Western region, on July 1, 1939. On September 1, 1941, he was appointed assistant supervisor of track at Cresson, Pa., and subsequently served in that capacity at Huntingdon, Pa., and Lewistown, Pa., until October 1, 1944. On the latter date he was promoted to supervisor at track at Orrville, Ohio, and one year later was transferred in that capacity to Alliance, Ohio, where he remained until April 1, 1948. On the latter date he was named supervisor of track on the Chicago division, which position he held until the time of his recent promotion.

Paul J. Harnish

E. C. B. Macnabb, whose promotion to district engineer on the Canadian Pacific at Moose Jaw, Sask., was announced in the January issue, was born November 27, 1914, at Regina, Sask. After graduation from McGill University in 1937, he entered the service of the Canadian Pacific as a blueprinter in the engineering department at Toronto, Ont. He was employed in that capacity until 1939, when he was promoted to transitman at Moose

E. C. B. Macnabb

Jaw. From 1941 to 1943, Mr. Macnabb served as a transitman at Revelstoke and Vancouver, B. C., and in the latter year was promoted to roadmaster at Yorkton, Sask. In 1945 he became division engineer at Moose Jaw, where he remained until 1950, when he was appointed assistant district engineer at Vancouver, B. C.—the position he held prior to his recent promotion.

John H. Hunter, who, as announced in the January issue, has been appointed special assistant engineer on the Atlantic Coast Line at Wilmington, N. C., was born at Chambersburg, Pa., on November 1, 1905, and received a B.S. degree in civil engineering from Georgia School of Technology in 1932. Following service with the U. S. Army from December 1940 to January 1946, Mr. Hunter entered the employ of the Coast Line as an assistant engineer at Savannah, Ga., and the following July was advanced to senior assistant engineer. In February 1947 he was

For additional information, use postcard, pages 211-212

John H. Hunter

appointed acting division engineer, and in June of that year was promoted to division engineer, with headquarters remaining at Savannah. Mr. Hunter held the latter position at the time of his recent appointment.

Track

H. C. Ruschman, junior engineer on the Cincinnati division of the Pennsylvania, has been appointed assistant supervisor of track on the Chicago division, succeeding **G. C. Miller.**

M. H. Montgomery, apprentice supervisor of track on the Central of Georgia, has been promoted to supervisor of track at Cedartown, Ga., to succeed **J. H. Chitty,** who has been transferred to Millen, Ga.

Virgil L. Odom, section foreman on the Southern, has been promoted to supervisor of track at Mt. Vernon, Ill. Mr. Odom was born on December 26, 1910, at Benton, Ill. He began service with the Southern as a section laborer in January 1940 and, after serving as tie adzer helper and operator, was appointed section foreman in August 1944.

R. G. Weaver, assistant roadmaster on the Seaboard Air Line at Miami, Fla., has been promoted to roadmaster at Williston, Fla., to succeed **Mr. J. A. George** who has been transferred to Hamlet, N. C. Mr. George replaces **J. F. Watson,** who has been transferred to Portsmouth, Va., to succeed **S. M. Heafner,** who has retired. **J. T. Brown,** roving assistant roadmaster, with headquarters at Columbia, S. C., has been transferred to Miami to replace Mr. Weaver.

D. R. Pinkerton, whose appointment as supervisor of track on the New York Central at Elyria, Ohio, was announced in the January issue, was born at Lowell, Ind., on May 21, 1898. He entered the service of the New York Central as a section laborer at North Hayden, Ind., on June 15, 1925, and subsequently served as a section foreman at Gary, Ind., and extra gang foreman at Indiana Harbor, Ind. In 1947, Mr. Pinkerton was appointed assistant supervisor of track at Englewood, Ill., and served in that capacity until his recent promotion to supervisor of track.

I. J. Echelberger, whose promotion to roadmaster on the Chicago, Burlington & Quincy at Central City, Neb., was announced in the January issue, entered the service of that road on March 22, 1935, as a section laborer at Minatare, Neb. He was promoted to section foreman at Angora, Neb., in March 1943, and served in that capacity successively at Henry, Neb., Curtis, Neb., and Guernsey, Wyo., until January 20, 1949, when he was appointed track supervisor at Fremont, Neb. Mr. Echelberger was appointed relief roadmaster at Greybull, Wyo., in April 1951, the position he held prior to his recent promotion.

Herbert O. Stratton, whose appointment as supervisor of track on the Pennsylvania at Williamsport, Pa., was announced in the January issue, was born at Chester, Pa., on November 12, 1925, and received his civil engineering degree from Yale University on February 22, 1946. The following June he entered the service of the Pennsylvania as an engineering apprentice at Columbia, Pa. He was advanced to assistant supervisor of track at Cresson, Pa., on August 15, 1947, and later served in that capacity at Phila-

(Continued on next page)

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Railway Personnel (Cont'd)

delphia, Pa., until August 1, 1950, when he was furloughed for military service with the U. S. Marine Corps. Upon discharge from military service on October 4, 1951, Mr. Stratton was appointed assistant supervisor of track at Wilmington, Del., the position he held at the time of his recent promotion.

D. W. Gangluff, whose promotion to supervisor of track on the Pennsylvania at Grand Rapids, Mich., was announced in the January issue, entered the service of the Pennsylvania on June 3, 1926. From that date until January 15, 1941, he served consecutively as a trackman, assistant track foreman and machine operator at Carrothers, Ohio. On the latter date he was promoted to extra gang foreman at Crestline, Ohio, and served in that capacity until August 1, 1942, when he was named general foreman, construction, Western region. On July 1, 1946, Mr. Gangluff was promoted to general foreman, maintenance, Sandusky, Ohio, and on May 16, 1951, was named assistant supervisor of track at Columbus, Ohio, which position he held prior to his recent promotion.

Bridge and Building

J. E. Krome, whose appointment as bridge designer in the engineering department of the Seaboard Air Line, with headquarters at Norfolk, Va., was announced in the January issue, was born at Homestead, Fla., on November 6, 1919. He attended Princeton university, graduating in civil engineering in 1947, and entered the service of the Seaboard at Tampa on September 16, 1947. In 1949 he was promoted from the position of assistant to the division engineer at Tampa, to assistant division engineer at Raleigh, N. C. Mr. Krome held the latter position at the time of his recent appointment.

J. T. Woodie, assistant supervisor of bridge erection on the Chesapeake & Ohio at Huntington, W. Va., has been promoted to supervisor of bridge erection, with headquarters at Richmond, Va., succeeding **J. F. Lockwood,** who has retired after 46 years. **M. L. Allen,** assistant to supervisor of bridge erection, succeeds Mr. Woodie. A native Virginian, Mr. Woodie has been working around C. & O. bridges since he joined the railroad in 1917 as a bridge carpenter. He was promoted to bridge foreman in 1920, to general foreman in 1929 and to assistant supervisor of bridge construction six years ago. Mr. Allen was born in Lowell, W. Va., and began his C. & O. career as a carpenter in 1923. He has also served as bridge foreman.

Joseph S. Lally, assistant supervisor of bridges and buildings on the New York Central at Rochester, N. Y., retired recently after more than 47 years of service.

S. P. Jakeman, bridge and building master on the Canadian National at Edmonton, Alta., retired recently after 39 years of service, and **A. Love,** bridge and building master at Dauphin, Man., retired recently after 28 years of service.

John L. Dahlrot, assistant general scale inspector on the Louisville & Nashville at Louisville, Ky., has been promoted to general scale inspector, succeeding **E. P. Cody** who has retired. **J. L. Finnell** former scale inspector succeeds Mr. Dahlrot as assistant general scale inspector.

C. H. Sinclair instrument man on the Chicago & North Western at Boone, Iowa, has been promoted to assistant supervisor of bridges and buildings at Huron, S. D., succeeding **W. G. Ward,** who has been transferred to West Chicago, Ill. Mr. Ward succeeds **D. L. Babcock** who has been appointed supervisor of bridges and buildings at Norfolk, N. D., succeeding **C. O. Sathre,** whose appointment as supervisor of bridges and buildings at Madison, Wis., was announced in the February issue.

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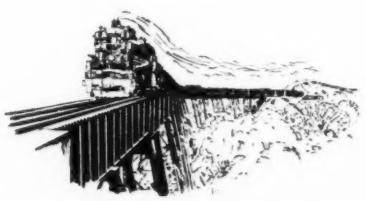

Obituary

Ross P. Johnston, retired division engineer on the New York Central, died recently at Rochester, N. Y., at the age of 87.

Association News

American Railway Engineering Association

The program of the association's fifty-first annual convention, to be held on March 11-13 at the Palmer House, Chicago, is reproduced elsewhere in this issue. All bulletins containing committee reports are now in the hands of the members and the yearbook was expected to be mailed out well in advance of the meeting.

A highlight story of the convention activities, including reference to the more important happenings, and illustrated by candid "shots" taken at the convention and the N.R.A.A. exhibit, will be presented in the April issue.

Maintenance of Way Club of Chicago

The February meeting was held on the 25th at Eitel's restaurant, Chicago. The principal speaker was H. M. MacFarlane, president, National Railway Appliances Association, whose subject was "Preview of N.R.A.A. Exhibit in March." In addition to reviewing the exhibit in a general way, Mr. MacFarlane summarized the improvements that have been made in recent years in the products of the companies who are in the business of manufacturing equipment, devices, and materials for use in the construction and maintenance of railway properties.

The next meeting will be held at the same place on April 28. The speaker will be C. J. Geyer, vice-president (construction-maintenance of way), Chesapeake district, Chesapeake & Ohio, whose subject will be "Management's Views on Maintenance of Way."

Wood-Preservers' Association

The forty-eighth annual meeting of the association will be called to order at 9:30 a.m. on April 22 at the Hotel New Yorker, New York. The business sessions of this convention will start on Tuesday, April 22, and continue through Thursday morning. However, in lieu of the usual Wednesday afternoon field trip, a ferryboat trip through the waterways of New York City has been arranged for Monday afternoon, April 21. It is because this event is scheduled to start from the Hotel New Yorker at 11:45 a.m. on Monday that members and guests are being requested to plan their arrival no later than early Monday morning.

Two papers will be presented at the convention that will be of particular interest to the users of treated timber on the railways. One of these, entitled "Diversified Uses of Treated Wood on Railroads," will be read by L. T. Nuckols, chief engineer, Chesapeake & Ohio, Chesapeake district, Richmond, Va.; while the other, entitled "The Use of Treated Lumber for Railway Car Repairs and Construction," will be presented by F. R. Denney, assistant mechanical superintendent, Texas & Pacific, Dallas, Tex.

Metropolitan Maintenance of Way Club

A dinner meeting of the club was held in the Skyline room of the Hotel Shelburne, New York, on February 28, the

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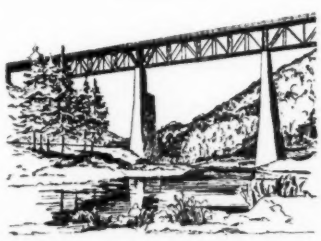

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Association News (Cont'd)

main feature of the evening being an open-forum discussion by four prominent supervisors from the New York Subway System, led by R. F. Frame, supervisor of track, on the subject "Problems Peculiar to Maintenance of New York Subways."

National Railway Appliances Association

Coincident with the annual convention of the American Railway Engineering Association, to be held at the Palmer House, Chicago, March 11-13, the N.R.A.A. will stage a record exhibit of manufacturers' products at the Coliseum. A complete list of the exhibitors, giving in each case a list of the products to be exhibited and the names of the representatives to be present, along with the booth numbers, appears in the feature section of this issue.

The annual meeting of the N.R.A.A. will be held on Tuesday, March 11, at 11:00 a. m. in the Grand Ballroom of the Coliseum. This meeting, which will be directed by President H. M. MacFarlane (Cullen-Friestedt Company), will be for the purpose of electing officers and transacting any other business that may be brought up.

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 15-17, 1952, Conrad Hilton (Stevens) Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 11-13, 1952, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual meeting, April 22-24, 1952, Hotel New Yorker, New York. W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting March 24. E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliances Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting, October 22-24, 1952, Jung Hotel, New Orleans, La. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 15-17, 1952, Conrad Hilton (Stevens) Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

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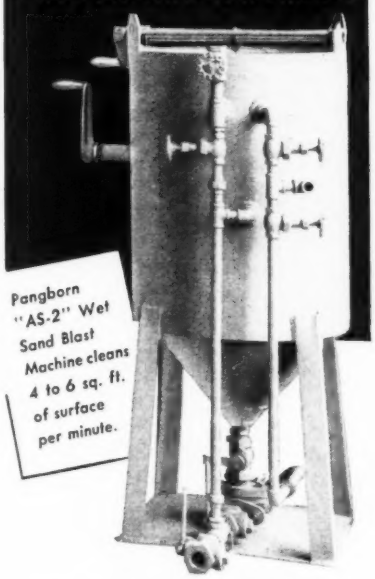

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BLAST CLEANS CHEAPER
with the right equipment for every job

Supply Trade News

General

Motorola, Inc., has announced the relocation of its Communications and Electronics Division. Formerly operating in the main radio and television plant on Augusta boulevard in Chicago, the two-way radio division is now producing from new quarters, immediately adjacent, at 4501 W. Augusta boulevard.

Personal

Milton J. Weber has recently been appointed vice-president, procurement, of the **Frank G. Hough Company,** Libertyville, Ill.

Fred W. Evinger has been appointed sales representative at Chicago for the **Lehon Company,** effective March 1. Mr. Evinger's office is located at 4425 S. Oakley Avenue, Chicago 9.

Guilford E. Koehler has been appointed district manager at Memphis, Tenn., for **Garwood Industries, Inc.,** Findlay Division and **William H. McAllister** has been appointed district manager for the Texas, Oklahoma and New Mexico territory.

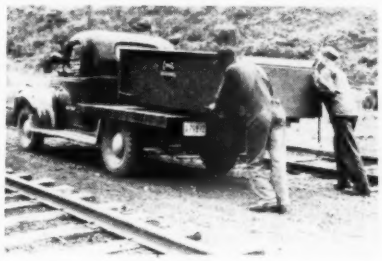
Wesley A. Harper has been appointed research engineer of the **Taylor-Wharton Iron & Steel Co.,** with headquarters at Cincinnati, Ohio. Mr. Harper was formerly chief engineer of the **National Farm Machinery Cooperative,** Bellevue, Ohio.

W. A. Enstrom and **W. F. Brietzke** have been appointed co-managers of the Railroad Track Material Division of the **Pettibone Mulliken Corporation,** with headquarters in Chicago. Mr. Brietzke has also been named manager of the company's Railroad Machinery Division.

John H. Dingee former advertising and sales promotion manager of **Henry Disston & Sons, Inc.,** Philadelphia, Pa. has been appointed sales manager of the power tool division of that company, succeeding **William P. Gillespie,** who has been appointed sales manager of the hardware division. Mr. Dingee joined Disston in June 1947 as sales promotion manager after nine years with the Keasbey & Mattison Company, where for seven years he was manager of advertising and public relations. In November 1948 he became advertising manager of Disston and later was placed in charge of all advertising and promotion work.

The Corrulux Corporation, Houston, Tex., has announced the opening of five divisional sales offices located throughout the United States. **G. D. Jefferson** has been placed in charge of the Northeastern division with headquarters at Wilming-

(*Cont'd on next page*)



PORTABLE
Dump Body with built-in hydraulic hoist

• It's the newly designed CONVERTO Railroad Dump Unit . . . perfected after nearly ten years of satisfaction on more than 75 railroads. Dump a full cubic yard of aggregate, concrete, waste material, coal, etc., with one man in about one minute. Unit is ready for use when you get it. Just "*slip it on . . . work it . . . slip it off*". Any place on the line where you are using shovels, you are paying for CONVERTO Units. Why not have them?

CONVERTO Railroad Dump Units are available in 1-Yard or 2-Yard capacity. Write for quotations to . . .

The BRICE HAYES Co.
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LARGE or SMALL . . .

BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY

Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only **BURRO** *cranes have:*

- *Fast travel speeds—up to 22 M.P.H.*
- *Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).*
- *Elevated Boom Heels for working over high sided gondolas.*
- *Short tail swing—will not foul adjoining track.*
- *Low overall height—Burro can be loaded and worked on a standard flat car (See illustration).*

Write for Bulletins

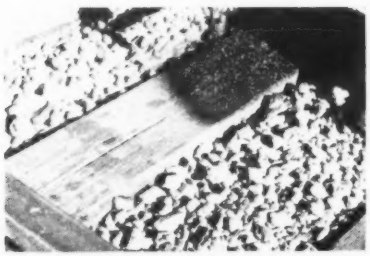
CULLEN-FRIESTEDT CO., 1301 S. Kilbourn Ave., Chicago 23, Illinois

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

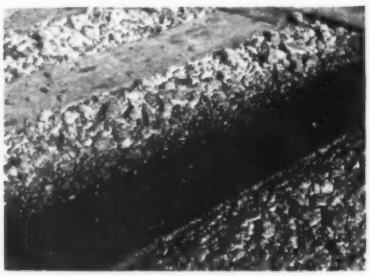
PROOF THAT

Protek-tie

DELAYS COSTLY CROSS-TIE REPLACEMENT



How weathering threatens the life of a comparatively new cross-tie



See how Protek-tie has coated and insulated the cross-tie shown above. Another "save" for Protek-tie.

Compare the two pictures shown. See how just one coat of PROTEK-TIE has completely filled up the cracks in the tie and is insulating the top surface from damage by sun, rain and other weather elements. Because of its special composition, PROTEK-TIE retains its plasticity and does not crack or chip even after long exposure to heat, cold and moisture. What's more, during hot weather PROTEK-TIE tends to seal newly developed cracks in the wood. PROTEK-TIE is easily applied . . . even at temperatures as low as 40°F. For full information regarding specifications and applications of PROTEK-TIE call or write today.

For full information, call or write

CHAMPION TRANSPORTATION SALES
222 W. Adams St. • Chicago, Ill.
"Exclusive Sales Agents To Railroads"

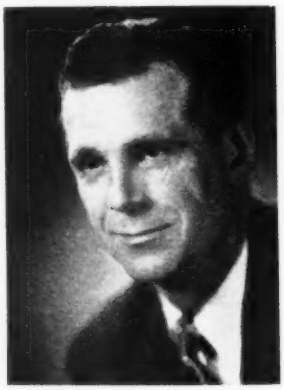
Protek-tie is made by

NOX-RUST CHEMICAL CORPORATION
2429 South Halsted St. • Chicago, Illinois
Baltimore • San Francisco • Detroit • Philadelphia

Supply Trade News (Cont'd)

ton, Dela.; **Carl Olson,** with headquarters at Atlanta, Ga., will be in charge of the Southeastern division; **L. V. Warner,** executive vice-president of the company, will be in charge of sales activities in the Middle West, with headquarters at Des Plaines, Ill.; **George Paradise** will be in charge of the West Coast division, with headquarters at Pasadena, Cal.; and **P. W. Fisher,** in charge of the Southwestern division, will have headquarters in the home office of the company at Houston.

Jack F. Holman has been appointed chief service engineer for the Railway Track Maintenance Machinery Division of the **Nordberg Manufacturing Company,** Milwaukee, Wis. Mr. Holman entered the services of this company in 1940 with an extensive background in the field of track maintenance through work on the Gulf



Jack F. Holman

Mobile & Ohio and the Illinois Central. Since that time, he has been active in the development of such Nordberg machines as the power jack, utility and flexible arm grinders, power wrench, spike hammer, cribex, ballastex-screenex and the yard cleaner.

Fairbanks, Morse & Co., Chicago, has announced the following changes in its sales organization: **J. A. Cuneo,** manager of the Chicago branch, has been promoted to general sales manager; **Milo C. Roy,** manager of the Omaha branch, has been appointed manager of the Chicago branch; **J. W. Wright,** manager of the Diesel Sales division, with headquarters in Chicago, has been appointed manager of the Omaha branch; **C. E. Dietle,** diesel department manager of the Chicago branch, has been promoted to manager of the Diesel Sales division; **W. B. Wylly,** manager of the Houston, Tex., sub-ranch, is now manager of the Atlanta branch; **L. A. Weom,** St. Louis branch manager, has been transferred to St. Paul, where he succeeds **A. C. Thompson,** who has retired after 45 years of service; and **Clifford J. Schroeer,** diesel department manager of the St. Louis branch, has been promoted to manager of the branch to succeed Mr. Weom. It was also announced that **H. L. Hilleary** will continue to serve as assistant sales manager.

Ask FOR THE BOSS WYTEFACE*

The NEW Steel Tape Easier to Use Lower Cost

K&E's new BOSS Wyteface, latest addition to the quality line of WYTEFACE steel tapes, features these outstanding advantages:

- Genuine Wyteface steel tape line (black markings on white background with foot markings in red).
- Wide-sweep winding handle—less friction.
- Convenient notched finger grip edge on rugged all-metal case.
- Outstanding value at **$4.90** for 50' and **$7.95** for 100' lengths.

FAVORITE® WYTEFACE—finest of all top quality steel tapes—is available in 25', 50', 75' and 100' lengths.

HANDY WYTEFACE steel tape rules: 98¢ for 6' length; $1.19 for 8'; $1.49 for 10'.

K+E
Drafting, Reproduction and Surveying Equipment and Materials. Slide Rules. Measuring Tapes.

There's a WYTEFACE for every purpose; see the complete line at your supply house or hardware store.

Prices Slightly Higher in the West

* Trade Mark

KEUFFEL & ESSER CO.
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NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • DETROIT
SAN FRANCISCO • LOS ANGELES • MONTREAL

Obituary

Walter W. Colpitts, senior partner of Coverdale and Colpits, consulting engineers, New York, died recently. He was 78 years old.

Howard Mull, vice-president in charge of sales for the **Warren Tool Corporation,** Warren, Ohio, whose death was announced in the February issue, began his career in the engineering department of the Cleveland, Cincinnati, Chicago & St. Louis in 1909. He left the service of that

Howard Mull

road in 1913 when he became associated with the Verona Tool Works in Chicago, where he served as traveling representative, Chicago sales agent, and sales manager until 1920. In the latter year, Mr. Mull became manager of the railroad departments of teh Reliance Manufacturing Company and the Warren Tool & Forge Co. In 1922 he was appointed vice-president in charge of railroad sales for the latter company, and when the company was reorganized into the Warren Tool Company, Mr. Mull served as sales manager. He was appointed vice-president in charge of sales in 1932, the position he held at the time of his death.

Trade Publications

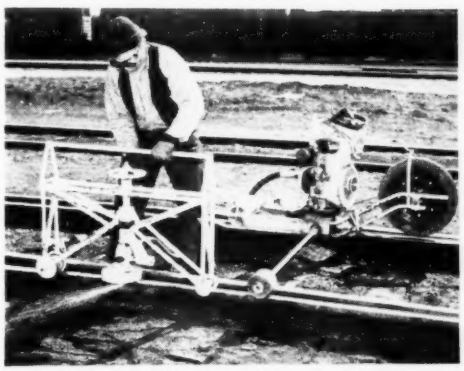
(To obtain copies of any of the publications mentioned in these columns, use postcards, page 211)

Fuel Dehydrator—Bowser, Inc., Fort Wayne, Ind., has recently released a leaflet describing the Bowser Uni-Pass Fuel Dehydrator. It gives complete specifications and dimensions of the two available models of this device, along with much useful information concerning the process of fuel dehydration. Special mention is made of the principles involved in the anti-slug control feature of the unit.

Caterpillar Diesel D2 Tractor—This is the title of a new catalog issued by the Caterpillar Tractor Company, Peoria, Ill. Part-by-part, the catalog explains how the machine is built, what it's like and how it performs. Typical jobs are shown, along with reports from actual D2 tractor owners. More than 60 pictures are included in the 32-page booklet.

(*Continued on page* 327)

Smooth Out More Miles of Track in LESS TIME with a Mall Combination RAIL GRINDER



Now your workers can remove overflow metal *faster* from stock rails and switch points . . . covering more miles of track per shift with a Mall Combination Rail Grinder. *It's faster, more rugged, more portable.* Full-service 8¼ hp. engine unit mounts an easy-rolling outrigger. One man moves or lifts it easily from track. Unit is insulated against signal system interference and has advanced safety features. You'll use the same rugged 8¼ hp. engine for quick-change tools on such tasks as rail slotting; drilling rails; frog, crossing and switch point grinding; wire brushing and many others . . . saving time and initial investment cash.

Write for Catalog No. 50.

40 Factory-Owned Service Warehouses, Coast to Coast, To Serve Our Customers and Thousands of Dealers.

More power to the pound . . . less pounds to handle.

Mall TOOL COMPANY

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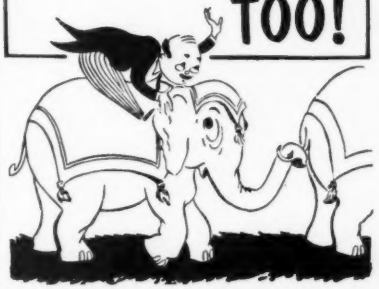
Clip and mail this CHECK LIST for details

LE-HI Makes a Good Connection TOO!



Specify LE-HI for all Hose Couplings!

Wherever hose is used there is a LE-HI hose coupling to match—from small tubing to large industrial applications.... The complete LE-HI line includes:

- Air Tool Couplings
- Welding Hose Couplings
- Steam Hose Couplings
- Fire Hose Couplings
- Acid Hose Couplings
- Sand and Blower Hose Couplings

SERIES 100

SERIES 600

- Drilling Hose Couplings
- Oil and Gas Hose Couplings
- Agricultural Hose Couplings

. . . plus complete lines of hose clamps, air valves and manifolds.

Sold through leading distributors and rubber manufacturers only.

"Old Doc" says: "Write now for your free copy of the complete LE-HI catalog"

HOSE ACCESSORIES COMPANY
1720 Lehigh Ave.
Philadelphia, Pa.

LE-HI Makes a Good Connection!

LE-HI
HIGH and LOW PRESSURE
HOSE COUPLINGS
TRADEMARK REGISTERED

PRODUCTS OF MANUFACTURERS

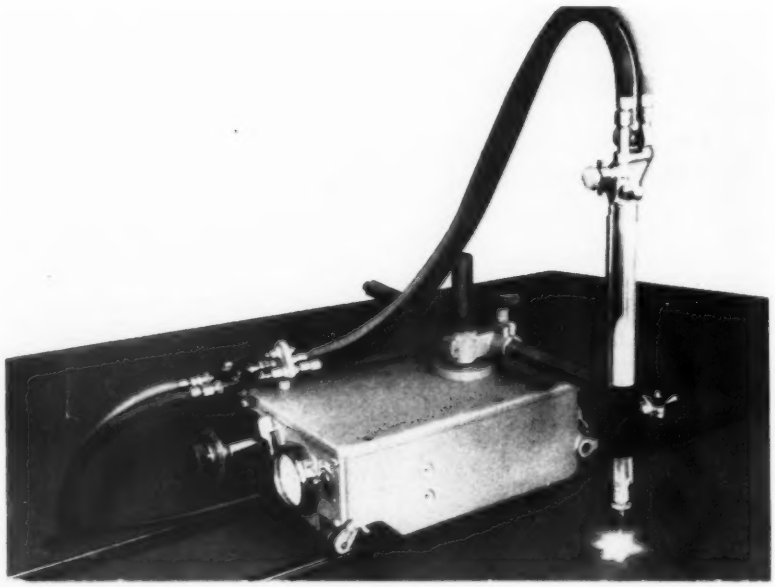
(*Continued from page 298*)

FLOOR COVERING FOR BUILDINGS

THE Tuco Products Corporation, New York, has announced that several railroads, in a search for an economical and serviceable covering for the floors in such buildings as stations, offices, towers, storerooms, etc., have turned to the use of Tucolith, a composition flooring which has been used successfully for many years in railroad rolling stock. This material, according to the manufacturer, is now available in new formulae and patterns designed particularly for use in buildings.

Consisting of a dry mix with a liquid binder, Tucolith can be easily mixed and laid by railroad forces without outside help. Because of its plastic composition, it is reported to be resilient and therefore easier on the feet than harder materials. Furthermore, the manufacturer guarantees that it is fireproof, waterproof and safe. Available in eight different colors (maroon, green, blue, tan, brown, gray, yellow, and black), Tucolith, depending on the interior color scheme, may be laid in a solid color, in alternating block colors, or in two-color floor-and-border patterns. The colors, according to the manufacturer, stay attractive even after years of wear.

The dry mix is shipped in 100-lb. bags, while the bonding material comes in either a liquid or a concentrated flake form. Before use, the flakes are diluted with water. After the dry mix and the bonding liquid have been thoroughly combined, Tucolith is ready to lay. The thickness of application recommended by the manufacturer is ½ in. on concrete or wood bases.



PORTABLE GAS CUTTING MACHINE

NEW in design, the No. 20 Radiagraph, manufactured by the Air Reduction Sales Company, New York, is the latest addition to Airco's line of portable gas cutting machines. The No. 20 Radiagraph is a portable, motor-driven, straight track-guided machine, possessing the advantages of a travelling carriage for carrying the cutting equipment past the work. When equipped with the proper accessories, it may be employed for circular and irregular shape cutting. All operating controls are conveniently located, and any required speed within the range of the machine can be set by finger-tip adjustment of the indexed speed control on the governor-controlled, variable-speed motor. Travel speed can be increased to as high as 60 in. per min., or decreased to as low as 2 in. per min., while cutting is in progress.

The No. 20 Radiagraph weighs 57 lb., without accessories, and can be readily carried to the work by one man. When properly equipped, the machine can be used for cutting straight lines, circles, arcs, and irregular shapes, with either square or beveled edges.

As a travelling carriage, the machine is recommended by the manufacturer for carrying such equipment as the Aircomatic machine, the Heliweld machine holder and filler wire feeder, and a flame hardening torch.

ADDITIONAL NEWS OF THE MONTH

(Continued from page 325)

Railway Personnel

General

Neil D. Hyde, who was recently appointed assistant vice-president of the New York Central, with headquarters at New York (RE&M, February, p. 159), was born at Alton, N. Y., November 19, 1889, and was graduated from Union College in 1911. From 1912 to 1917 he was engaged in engineering work on the New York State Canal Terminals, highway construction in Delaware, and New York Central improvements at Utica, N. Y. In 1917 he entered the service of the Corps of Engineers, U. S. Army, where he served as a lieutenant until 1920 when he became associated with

Neil D. Hyde

the New York State Engineers, Department Buffalo Harbor Improvements. In 1922 Mr. Hyde entered the service of the New York Central on the construction of the Hudson River Connecting Railroad, and from 1926 to 1932 worked on construction, highway crossing elimination and grade revision from Schenectady to Voorheesville, N. Y. In 1933 he was transferred to the chief engineer's office at New York and served as special engineer at that location from 1936 to 1943. In 1944 he was named assistant to the chief engineer, Chicago, and in 1945 was promoted to assistant to the vice-president there, being transferred to New York, on January 1, 1951.

R. H. Boykin, who recently retired as superintendent of the Wyoming and Jefferson divisions of the Erie, with headquarters at Dunmore, Pa. (RE&M, February, P. 159), was born at Petersburg, Va., and studied civil engineering at Columbia University. He joined the Erie as an axeman for an engineering gang at Cory, Pa., in 1905 and advanced through various engineering and construction jobs on the Meadville, Allegany, New York, Susquehanna and Marion divisions until 1914. He was promoted to division engineer on the Kent division in the latter year and later transferred to the Delaware and Wyoming division, subsequently becoming superintendent of terminals at New York, superintendent of the Mahoning division at Youngstown, Ohio and assistant general manager of the Eastern district at Jersey City. Mr. Boykin was appointed superintendent of the Wyoming and Jefferson divisions at Dunmore in 1938.

J. H. Hande, who recently retired as assistant to vice-president, operation and maintenance, of the Baltimore & Ohio at Baltimore (RE&M, February, p. 159), was born at Park Ridge, Ill., and studied engineering at the University of Wisconsin. From 1905 to 1911 he was assistant engineer with the Chicago & North Western and an inspector in the rehabilitation of the Chicago street railways. He then served as division engineer with the Duluth, Winnipeg & Pacific (Canadian National) on new line construction, and was also engaged in valuation of that road's properties for the state Railroad & Warehouse Commission. Mr. Hande joined the Baltimore & Ohio in January 1917 as assistant engineer on federal valuation of its Chicago terminal properties. He be-

(Continued on page 328)

STOP

At Booths 57-58-59 and let us show you the modern, efficient, Kalamazoo motor cars.

Shown above is the **KALAMAZOO 57B** Patrol Car. This unit is extremely easy to handle, yet has a 10 h.p., 2 cylinder engine, transmission allowing two speeds in either direction, and an automotive type dry plate clutch. Truly the most modern car of this type on today's market.

SEE ALSO

The new 27AW-F Extra Gang Car
The Xpediter
The Speed Truck
Gauges and Levels

KALAMAZOO MANUFACTURING CO.

KALAMAZOO, MICHIGAN

Railway Personnel (Cont'd)

came special engineer on the staff of the chief engineer, Western lines, at Cincinnati, in August 1918, improvement engineer at Baltimore in 1920, auditor of capital expenditures in October 1939, and assistant to vice-president, operation and maintenance, in June 1946.

Engineering

Carroll W. Sigmon, who was recently promoted to division engineer on the Southern at Asheville, N. C. (RE&M, February, p. 162), is a native of Conover, N. C. and was born on November 14, 1898. He entered the service of the Southern as a section laborer in October 1913, serving later as an apprentice foreman. In February 1919 he was promoted to section foreman. He was appointed track supervisor at Bryson, N. C., in May 1937 and was transferred in that capacity to Asheville in November 1940.

As reported in the February issue, **W. B. Mackenzie,** maintenance bridge engineer of the St. Louis-San Francisco, has been appointed bridge engineer, succeeding **R. B. Hennessy,** retired. Mr. Mackenzie entered railroad service in 1916 with a summer survey party for the Intercolonial, now the Canadian National. He joined the Frisco in 1922 as an instrument man, and subsequently was bridge draftsman, assistant engineer and assistant bridge engineer. In 1947 he was appointed maintenance bridge engineer.

Starting as levelman for the El Paso & Southwestern, now the Southern Pacific, in 1907, Mr. Hennessy joined the New Orleans, Texas & Mexico (now the Gulf Coast Lines) as assistant engineer on bridge construction in 1909. He served in the bridge engineer's office of the Frisco from 1911 until 1918, at which time he was appointed assistant bridge engineer. He became bridge engineer in 1929, and held this position until his recent retirement.

W. B. Mackenzie

Bridge and Building

J. R. Flack, junior engineer, bridges and buildings, of the Philadelphia Terminal division of the Pennsylvania, has been appointed assistant supervisor of structures on the Lake division.

Supply Trade News

Personal

Fred W. Smith, sales representative for the railway publications of the **Simmons-Boardman Publishing Corporation** has been elected vice-president of the corporation, with headquarters as before at Chicago.

Mr. Smith was born at Coal Valley, Ala., on December 31, 1910, and received his education in structural engineering from the International Correspondence Schools. He entered railroad service in 1937 as a rodman–transitman for the Birmingham, Ala., where he remained until 1941 when he became railroad engineer for Alvord, Burdick & Howson, consulting engineers, Chicago. In 1942 he joined the Chicago, Rock Island & Pacific as an engineer-estimator and in 1945 joined the Simmons-Boardman Publishing Corporation as an associate editor on the **Railway Engineering and Maintenance Cyclopedia.** From 1946 to 1947 he was associate editor in the purchases and stores department of **Railway Age,** and in the latter year was appointed sales representative.

Fred W. Smith

R. A. Snyder has been named district sales manager of the Industrial Cleaners Division, **Pennsylvania Salt Manufacturing Company,** with headquarters at Los Angeles, Cal., and **K. W. Montfort** has been appointed district sales manager of the Agricultural Chemicals Division of that company, with headquarters at Portland, Ore.

One powerful 5-HP Gravely Tractor offers a choice of 20 tools! . . . Does off-track mowing, platform sweeping, snow removal, lawn mowing. All grounds maintenance handwork is done with POWER – *faster, better!*

One Gravely Tractor with the proper attachments will make one man as effective as eight!

All-gear drive, power reverse. Works on steep slopes, rough ground. Railroad-tested for 31 years. Free Booklet, "Power vs Drudgery" tells how Gravely POWER frees your men for other work, increases efficiency, saves maintenance dollars. Write for it today!

Gravely Motor Plow & Cultivator Co.
BOX 342 DUNBAR, WEST VIRGINIA

What Our Readers Think

ARE BRANCH LINES NEGLECTED?

TO THE EDITOR:

A RAILROAD might best be compared to a tree, the main line being as the trunk and the branch lines the branches. The branches on a tree are its life; cut them off and you have nothing. So it is with the railroads—cut off the branches or feeders and we soon have no railroads, except possibly a few cases where a piece of railroad is used as a connecting link between two main lines or between two large cities. The question naturally arises: Are we neglecting the Branch Lines? In my opinion the answer is "yes." The usual comment is that they don't pay. This is like a farmer who has a cow he can't afford to feed; if he can't afford to feed it, then he should sell it, and the same might be said for a railroad that has a branch line that does not pay. It should be taken up.

We have heard it said many times that a branch line does not look too good, and yet the most efficient labor on any railroad may be on the branches. One time I heard a high officer say that it took a better foreman on a branch than on the main line. The branch-line foreman must know his worst spots and take care of them first; no one is going to help him. But on the main line an extra gang may be moved in to fix up a particularly rough spot. If the main line needs ballast, it gets it, but the branch line gets little, if any, and what the foreman does get he usually has to put under the ties with three or four men.

The branch-line section will have 35 to 40 miles of right-of-way fence; the main-line section 18 to 20 miles. The branch line has 18 to 20 miles of right of way to cut and clean; the main line 8 to 10 miles. The main line gets the ditcher and good drainage. The branch may possibly get a ditcher, but generally not and it will not be possible to use costly hand labor for this purpose except to a minor extent. The main line will run the bolt tightener and tamping machines, but the branch does it the hard way mostly by hand. The main line has good heavy rail, laid new; the branch gets almost anything from 56-lb. rail on up, usually rail taken off the main line that has become so badly worn or bent that it is not fit for further main line service. In a year or two these bent rails commence showing up on the branch lines.

On the main line the roadbed is stabilized when this becomes necessary, but the soft spots on the branch line are ignored; as every one says it is just a branch with low-speed service. Every maintenance officer knows that the lighter patterns of switches and crossings, the lighter tie plates, the larger number of ties to be renewed because of the longer sections, the longer time required to patrol these longer sections—all these things and many others reduce the actual number of productive hours on branch lines. The revenue on some branches is good, on some it is too low, which brings us back to the farmer's cow—if you can't feed 'em; sell 'em.

ROADMASTER

WOLMANIZED Reg. U. S. Pat. Off.

Pressure-Treated Lumber and Plywood

protects against **DECAY AND TERMITES**

"WOLMANIZED" treated wood prevents rot and termite damage. This clean, paintable treated material will last 3 to 5 times longer than untreated wood in severe service conditions. Approved as standard by A. R. E. A.

Both "WOLMANIZED" and "MINALITH" materials are treated by the standard vacuum-pressure process at wood preserving plants such as shown at the right.

MINALITH Reg. U. S. Pat. Off.

Fire-Retardant Lumber and Plywood

protects against **FIRE**

"MINALITH" fire-retardant treated wood will not ignite or support combustion. Underwriters' Laboratory classifies "MINALITH" as a fire-retardant, having a flame spread rating of 30. "MINALITH" treated materials are in the Federal Specifications for Fire-Retardants (Type 2) and in the Fire-Retardant standards of the American Wood-Preservers' Association.

AMERICAN LUMBER & TREATING CO.

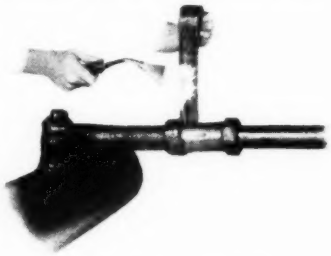
General Offices: 332 South Michigan Avenue • Chicago 4, Illinois

Sales Offices in BOSTON, NEW YORK, BALTIMORE, JACKSONVILLE, FLA., LITTLE ROCK, PORTLAND, ORE., SAN FRANCISCO and LOS ANGELES.

More and more railroad maintenance men are depending on TAPECOAT to protect pipe joints and short pipe sections in underground service, at bridge crossings and wherever corrosion is a problem.

TAPECOAT is the coal tar protection in handy tape form. It comes in widths of 2, 3, 4, and 6 inches for spiral wrapping; and in widths of 18 and 24 inches for cigarette wrapping of large diameter pipe, tanks, etc.

Application is quick, easy, economical. Just a flash of a torch and TAPECOAT provides a perfect lasting bond to seal out the elements of corrosion.



TAPECOAT engineers have specialized in this protection for more than 10 years. Call on them to help you work out your individual requirements.

Write for full details

*Reg. U. S. Pat. Off.

Originators of the Coal Tar Tape for Pipe Joint Protection

1541 Lyons Street, Evanston, Illinois

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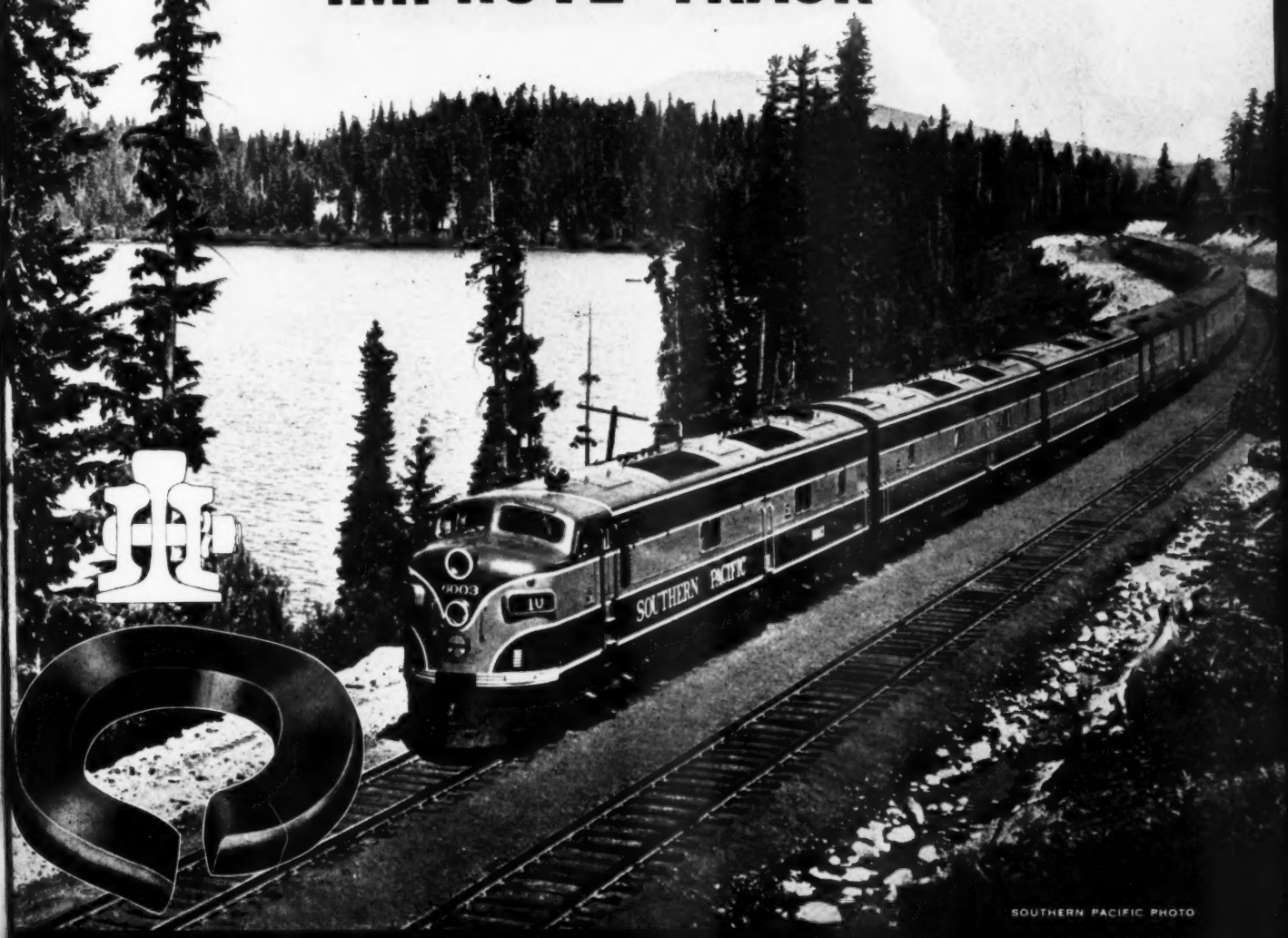

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